anada. Indian affairs and northern
de elopment dept. Industrial
division
[Area economic surveys.]
Baffin Island - East Coast an
area economic survey. Editor G.
Anders. 1967,

BAFFIN ISLAND – EAST COAST

an area economic survey

Editor : G. ANDERS

Sen. Author : A.A. HALLER
Res. Supervisor : D.C. FOOTE
Contributor : P.D. COVE

INDUSTRIAL DIVISION NORTHERN ADMINISTRATION BRANCH
DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

THE EAST COAST OF BAFFIN ISLAND

an area economic survey

1966

A.E.S.R. #66/4

Editor: G. Anders

Contributions by: A. Haller

D. Foote

P. Cove

The views, conclusions and recommendations expressed herein are those of the contributors and not necessarily those of the Department of Indian Affairs and Northern Development.

Industrial Division,
Department of Indian
Affairs and Northern
Development.

Ottawa, November 1967.

PREFACE

This report is one of a series of Area Economic Surveys carried out by the Industrial Division of the Department of Indian Affairs and Northern Development.

These surveys are a continuing part of the Department's efforts to determine the basis for local economic and social progress in the Northwest Territories. Basically the surveys are intended to:

1) Assess the renewable resources as to their ability to sustain the local population.

2) Determine the degree of exploitation of these resources and the efficiency of their use.

3) Investigate and explain the social and economic factors affecting resource utilization.

4) Recommend ways and means whereby the standard of living of the local people might be improved.

As the reasons for these surveys are practical, the material presented in the reports is selected for its relevance in this respect; much academic material gathered in the course of the investigation which may have been taken into account in the deliberations is necessarily excluded from these reports. On the other hand,authors have been given wide latitude in their approach and have been encouraged to give consideration to key problems of a theoretical nature and to include such theoretical argument where its inclusion is thought to contribute to the understanding of the material presented and of the practical conclusions drawn.

The reports are published primarily for use within the Department, for distribution to other interested government agencies and for limited distribution to libraries, universities and organizations and individuals actively engaged in northern research, administration or development.

The following reports in this series have been published to date or are in preparation:

A.E.S.R. #	Title	Author
58/1	Ungava Bay	J. Evans*
60/1	The Squatters of Whitehorse	J. Lotz
62/1	Southampton Island	D. Brack
62/2	Tuktoyaktuk-Cape Parry	G. Abrahamson*
62/2	Western Ungava	R. Currie*
63/1	The Copper Eskimos	G. Abrahamson
63/2	Keewatin Mainland	D. Brack and D. McIntosh*
63/3	Yukon Territory Littoral	R. Currie*
65/1	Banks Island	P. Usher
65/2	Northern Foxe Basin	G. Anders
66/1	The Mackenzie Delta	D. Bissett
66/2	Rae-Lac La Martre	G. Anders
66/3	Frobisher Bay	S. MacBain (Miss)
66/4	East Coast-Baffin Island	G. Anders, Ed.

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65/1	[illegible]	[illegible]
65/2	South Coast-Baffin Island	G. Anders, Ed.

67/1	Lancaster Sound	D. Bissett
67/2	South Coast - Baffin Island	G. Higgins
67/3	South Shore-Great Slave Lake	D. Radojicic
67/4	Central Mackenzie	D. Villiers (Miss)

* Out of print at time of publication; to be re-issued.

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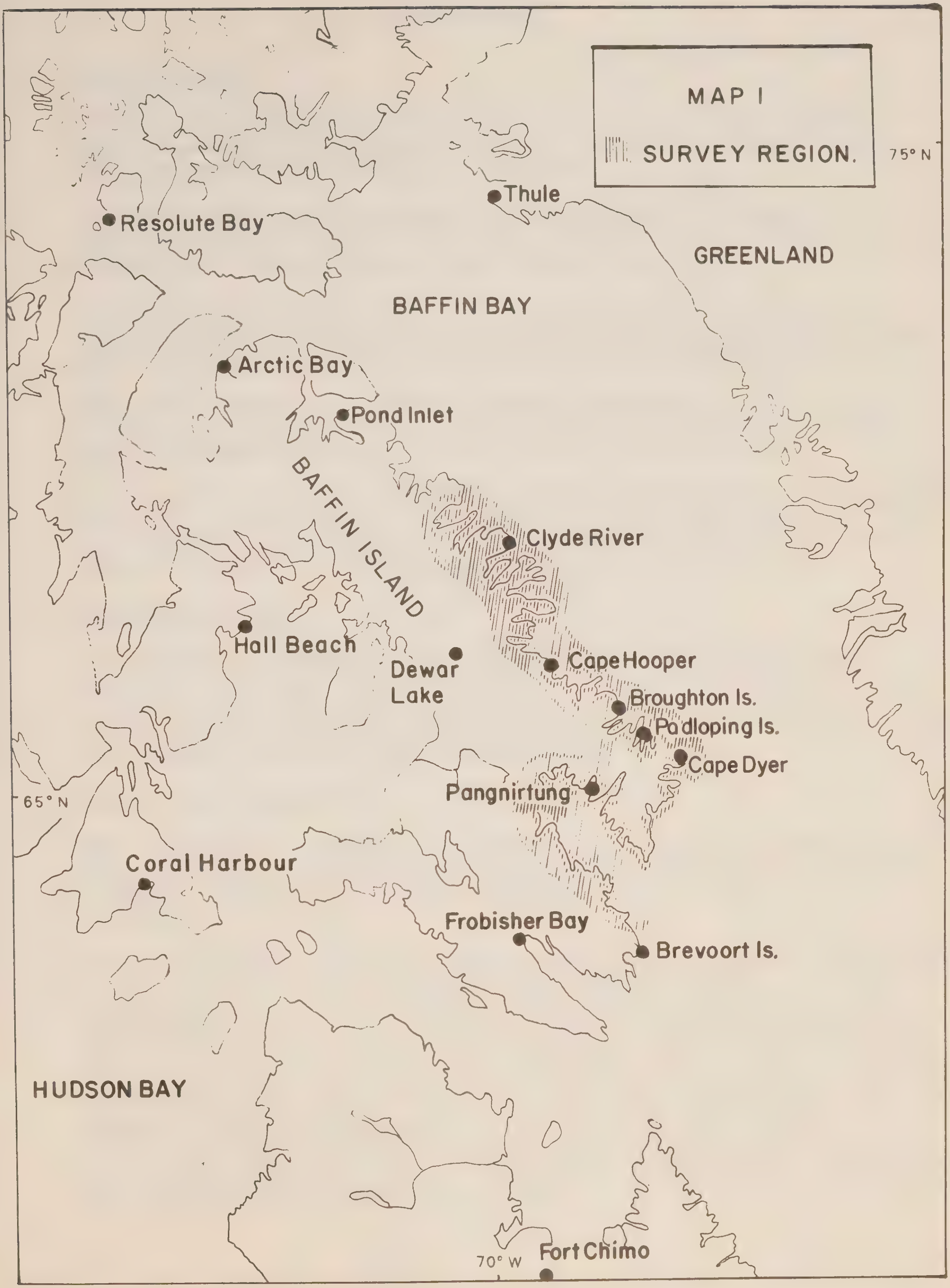

MAP I
SURVEY REGION.
75° N
Thule
Resolute Bay
GREENLAND
BAFFIN BAY
Arctic Bay
Pond Inlet
BAFFIN ISLAND
Clyde River
Hall Beach
Dewar Lake
Cape Hooper
Broughton Is.
Padloping Is.
Cape Dyer
Pangnirtung
65° N
Coral Harbour
Frobisher Bay
Brevoort Is.
HUDSON BAY
70° W
Fort Chimo

INTRODUCTION

SCOPE OF SURVEY

Within the basic framework of the Department's series of Area Economic Surveys, the following subjects were given particular attention in the course of the East Coast-Baffin Island Survey:

A detailed analysis of the seasonal hunting patterns of the people of Cumberland Sound was carried out. This analysis attempted in particular to relate the conduct of hunts to the physical environment.

The economics of seal hunting by mechanized means were investigated and a comparison with the costs of hunting by more traditional means was attempted under the particular conditions prevailing in the Cumberland Sound area.

The investigation of the available renewable resources and of the extent of their present utilization was carried out in far more detail for the Cumberland Sound area than for other parts of the survey region.

In the course of interviews, particularly with older Eskimos in the Cumberland Sound area, a large number of old Eskimo place names were collected. These were assembled in a special map which could not be included in the report but may be consulted in the Departmental Library.

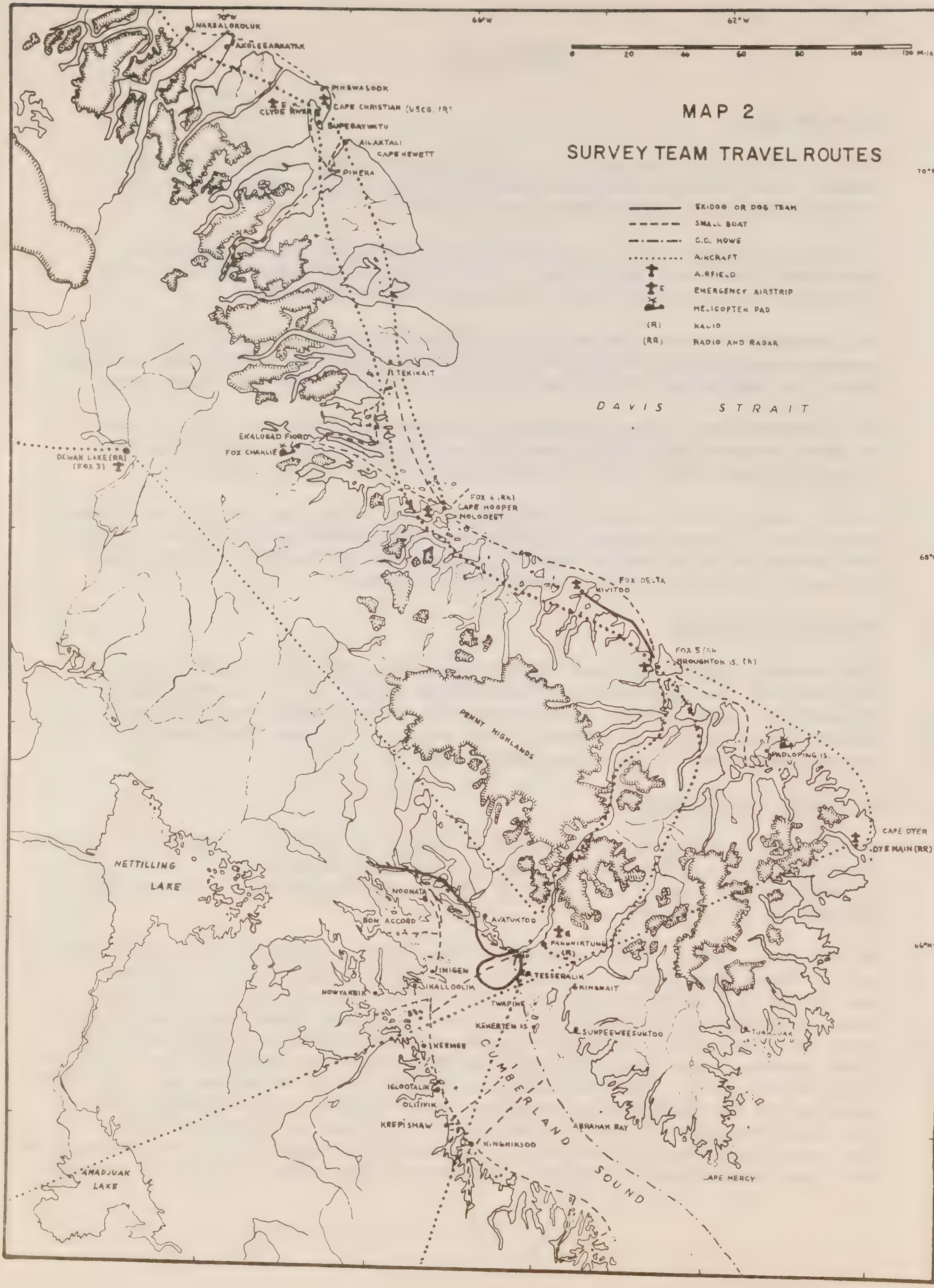
THE RESEARCH REGION

The research region extended from Naksalokoluk, 70° 45' degrees north latitude, to the south coast of Cumberland Sound, 64° 30' degrees north. It took into account that area utilized by, or available for utilization by, present and potential residents of the region. In total the research region covered more than 70,000 square miles (Map 1).

PERSONNEL AND ITINERARY

Field work for this survey was carried out by A. Haller, D. Foote and P. Cove. The final report was assembled from the separate accounts of D. Foote and A. Haller - the latter's in form of an M.A. thesis for McGill University - and edited by G. Anders.

On May 12th, Messrs. Haller and Cove departed from Montreal for Pangnirtung, N.W.T. where they arrived on May 13th and 16th respectively. Mr. Foote arrived in Frobisher Bay on June 28th, and Broughton Island on July 5th. After carrying out preliminary field studies in the Broughton Island-Kivitoo area, Mr. Foote flew to Pangnirtung on July 14th where he joined the other party members. Mr. Cove departed from Pangnirtung on July 25th and Mr. Foote left on July 31st. They both arrived at Clyde River on August 1st. Mr. Haller remained in the Pangnirtung-Cumberland Sound region until September 7th. Mr. Cove conducted research in the Clyde River area until August 31st. Mr. Foote flew from Clyde River to Cape Hooper on August 10th. He investigated the Cape Hooper-Home Bay region until August 22nd when he travelled by small


MAP 2
SURVEY TEAM TRAVEL ROUTES
SKIDOO OR DOG TEAM
SMALL BOAT
C.D. HOWE
AIRCRAFT
AIRFIELD
EMERGENCY AIRSTRIP
HELICOPTER PAD
(R) RADIO
(RR) RADIO AND RADAR
0 20 40 60 80 100 120 MILES
70°W
66°W
62°W
70°N
68°N
66°N
DAVIS STRAIT
CUMBERLAND SOUND
NETTILLING LAKE
AMADJUAK LAKE
PENNY HIGHLANDS
NARSALOKOLUK
AKOLEESARKATAK
PINGWASOOK
CAPE CHRISTIAN (USCG. (R)
CLYDE RIVER
SUPEBAYUKTU
AILAKTALI
CAPE HEWETT
PINERA
TEKIKAIT
EKALUGAD FIORD
FOX CHARLIE
DEWAK LAKE (RR)
(FOX 3)
FOX 4 (RR)
CAPE HOOPER
NOLOOEET
FOX DELTA
KIVITOO
FOX 5 (RR)
BROUGHTON IS. (R)
PADLOPING IS.
CAPE DYER
DYE MAIN (RR)
NOONATA
BON ACCORD
AVATUKTOO
PANGNIRTUNG (R)
IMIGEN
SIKALLOOLIK
TESSERALIK
KINGNAIT
NOWYAKBIK
TWAPINE
KEKERTEN IS
SUKPEEWEESUKTOO
IKEEMEE
IGLOOTALIK
OLITIVIK
KREPISHAW
KINGNIKSOO
ABRAHAM BAY
CAPE MERCY

boat to Broughton Island and Padloping Island. During the field study period survey members travelled approximately 450 miles by dog team and skidoo, 2,500 miles by small boat and 3,000 miles by aircraft within the research region (Map 2). Additional file and library research was carried out in Montreal, Ottawa and Fort Smith, N.W.T. Due to the organization of the field work some sections of this report are divided into a general treatment of the subject for the whole region and a more detailed account for Cumberland Sound. The former were generally derived from Mr. D. Foote's draft, the latter from Mr. A. Haller's thesis.

ACKNOWLEDGEMENTS

The success of any field research in the north depends upon the co-operation and whole-hearted support of many individuals. Gratefully acknowledged is the aid given by Messrs. J. Evans, R. Kennedy, J. Hughes, W. Morrison, R. Pilot, J. Cummings, J. Mason, E. Gamble, L. Zerr, C. Lentowicz, K. Kristanson, J. Gabrowski, S. Rowen, T. Demcheson, D. Hutchinson, D. James, Ipeelee Nowyakbik, Jassie Nukiguak and Simonee. Particular thanks are due Dr. A. Mansfield of the Fisheries Research Board of Canada for his continuing assistance.

THE PHYSICAL ENVIRONMENT

INTRODUCTION

Although the east coast of Baffin Island is remote and much is unknown about the area, a good deal of scientific research has been carried out there on specific subjects. The following sections utilize the results of this work but do not represent an exhaustive search of all literature pertinent to the region's physical environment.

CLIMATE - GENERAL

Meteorological observations have been taken at a number of sites on eastern Baffin Island, especially since 1940. Table 1 lists the primary reporting stations and the dates for which weather data have been published.

Climate can be viewed with respect to the radiation and thermal environment of the earth's surface, the atmosphere's ability to do work upon the earth's surface and the way in which atmospheric change may account for change in the earth's surface by converting water.

Solar Radiation - Solar energy provides light, it is fundamental in the photosynthesis process and it contributes to the overall thermal environment in which plants and animals live. Unfortunately, solar radiation is not measured at meteorological stations on eastern Baffin Island. Although some measurements have been made at high altitudes on the larger inland ice caps of the island, the best approximation of short wave radiation actually absorbed at the surface is presented by Vowinckel and Orvig. Figures calculated from these data are given in Table 2. A second measure of solar radiation, namely the duration of sunlight and civil twilight, have been computed from the theoretical maximum values for two selected latitudes and are shown in Table 3. It should be pointed out that the duration of sunlight and value of direct solar radiation are reduced by the low angle of incidence, especially in mountainous areas where shadow affects the effective duration of direct insolation, and by periods of heavy cloud cover. Table 4 illustrates the monthly amounts of cloud cover at selected stations.

Surface Air Temperatures - A comparison of Tables 2, 3 and 4 shows that during the spring, summer and autumn the theoretical values of direct solar radiation and the duration of sunlight are reduced by relatively high frequencies of cloud cover. The cloud, usually in the form of fog or low stratus cloud, is often induced by the presence of sea ice. Summer surface air temperatures, therefore, are in part a reflection of the presence of cold marine waters, often ice covered, that penetrate the mainland either in deep fjords or in large embayments such as Cumberland Sound. Cloud cover, and the low angle of incidence of the incoming radiation also lead to low air temperatures. Table 5 gives the mean monthly surface temperatures for selected stations.

Advection of Air - It is through the movement of air that heat and moisture can be transported from one latitude to another. It is usual to speak of moving air as associated with either cyclones (low pressure areas) or anticyclones (high pressure areas). Eastern Baffin Island is affected in winter by a number of cyclones passing northward into Baffin Bay. Occasionally warm air is carried north in association with these travelling lows. Although the winter cyclones are cold and normally contain little moisture, they do contribute to the high snowfall of the east coast, especially in the mountainous areas. In Table 9, for example, it can be seen that Cape Dyer receives an average annual snowfall of 215.8 inches, Brevoort Island 113.9 inches and Pangnirtung 100.7 inches. Moreover, warm air carried north can bring maximum temperatures to near or above freezing in any of the winter months.

In summer time cyclonic activity increases along the coast. Disturbances continue to affect the area on their northward course into Baffin Bay but additional low pressure systems pass over the region from the west. These cyclones are often warm and humid. As a result they bring thick cloud and light precipitation. In a large part this fact accounts for the high precipitation figures for all stations during summer. The mountains of the east coast also receive orographic precipitation caused by the lifting of air to higher elevations.

Anticyclones are of less importance to the advection of air over eastern Baffin Island. When they do occur, however, they can lead to a northward flow of mild, humid Atlantic air into the Baffin Island region in winter. These situations, therefore, contribute to the wide range of maximum and minimum air temperatures recorded on the east coast (Table 6).

Wind Direction and Speed - Normally the direction and speed of surface winds over eastern Baffin Island are related to the general atmospheric circulation over the region and the passage of cyclonic or anti-cyclonic disturbances. As can be seen from Table 7, the predominant wind directions for the coastal stations are from the west, northwest and north. Southerly winds are most frequent during the summer months. Wind speeds, shown in Table 8, also vary with season. Spring time appears as a relatively calm period,summer is the season of moderate winds, autumn and winter are periods of moderate to heavy winds. Although high winds are infrequent they usually occur in winter. Little data are available on wind velocities over Baffin Bay. Walmsley has computed the theoretical mean wind speeds across the surface of Baffin Bay between the latitudes 65^{o} to 70^{o} north. These calculations, shown in Figure 1, indicate maximum speeds in February and October and minimum speeds in July.

Lastly, the mountainous topography of the region and the high probability of pronounced thermal differences between land and sea, upland and lowland, during the summer season particularly, lead to special situations of wind direction and speed. The complex coastline and relief of the region means that regardless of the prevailing wind it is highly probable that the local topography will produce areas of calm as well as gusty winds blowing from directions contrary to the prevailing wind. The unequal heating of adjacent areas leads to air drainage winds, katabatic winds, and, more importantly, land and sea breezes. Throughout the summer it was observed in many places that a relatively strong onshore breeze was common during the warmer hours of the day, from perhaps 10:00 a.m. to 4:00 p.m. Offshore breezes, although perhaps not as frequent, usually began in the late afternoon and continued for several hours.

CLIMATE - CUMBERLAND SOUND

During the winter a strong low pressure area is developed over Iceland. As a result the winds flow down the western side of the cyclone bringing cold northern air to Baffin Island. Combined with radiative cooling, a cold prolonged winter is therefore assured. The inflow of frequent anticyclones, accompanied by clear skies, characterized the spring months of March, April and May. In June a reduced frequency of anticyclones heralds the coming of summer. Cyclonic activity is increased resulting in periods of thick cloud and moderate precipitation. Following a short autumn in September, there is a rapid reversion to winter conditions.

Although Baffin Island is affected by large numbers of cyclones throughout the year, these cyclones lack abundant water vapour. They differ, therefore, from mid-latitude cyclones and bring relatively little stormy weather. Concerning the thermal regime, the island experiences a continental Arctic annual and diurnal cycle of temperatures. The summers are short and warm and the winters long and cold.

In the Cumberland Sound region this general system is modified by topography and the expanse of cold water. Due to the low angle of the sun in the Arctic, the steep fjord walls and high hills are effective in reducing the duration of direct sunlight. Shadows remain longer in the valleys and the heating of these areas takes place at a slower rate. Unequal exposure to wind and solar radiation creates a series of local micro-climates.

The ice cap on the Penny Highlands and the fjord coastline provide conditions conducive to katabatic winds. A violent wind of this sort in 1934 exceeded 100 miles per hour at Pangnirtung. When these winds reach the sound they usually disperse and decrease in velocity. For example, in Kingnait Fjord, a complete calm can be present at the lower part of the fjord while a storm is raging at the head. This happens so frequently that two distinct climates may be found within this inlet.

The ice and water in the sound also modify the climate. During the summer surface water temperatures do not exceed 40°F. This cold water retards the warming of coastal areas and affects interior areas adjacent to fjords. In addition, the thermal lag of the water creates fog conditions in the spring and late summer thereby reducing visibility and restricting the number of hunting trips.

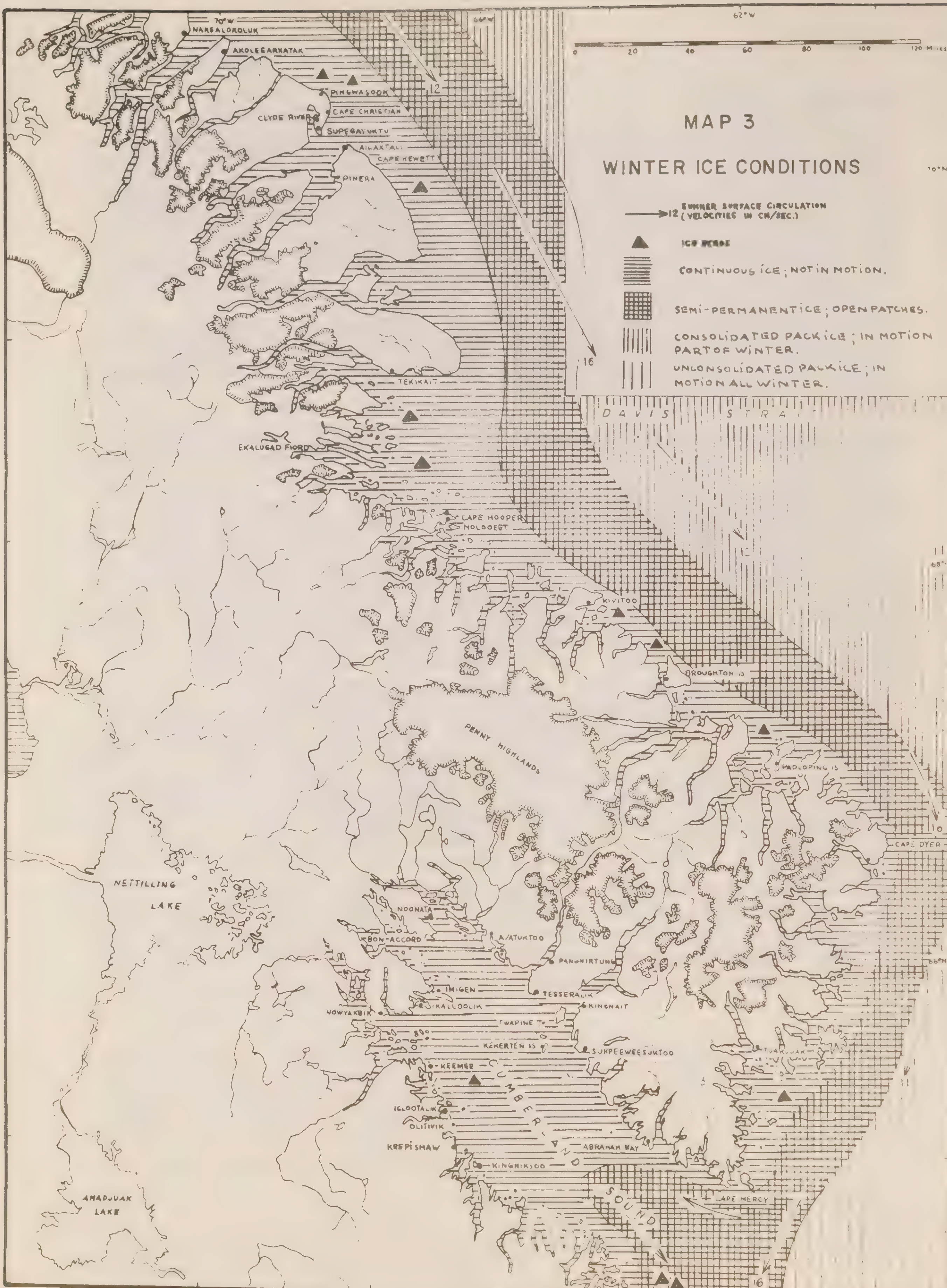
Table 10 shows climatological data for Pangnirtung. The winter period is long and cold but annual fluctuations occur. In the month of January 1933 and 1935 the mean temperatures were -25.6°F and -27.4°F respectively while the mean for the same month in 1936 was -7.9°F and as high as -2.3°F in 1940. Hare associates such fluctuations with prolonged invasions of Atlantic maritime polar air masses.

According to the inhabitants of Pangnirtung, the summer of 1966 seemed to be generally drier and the weather clearer than the previous years. The snow had disappeared from the ground by mid-June and the first autumn snow at Pangnirtung fell on September 14th.

ICE COVER - GENERAL

Freshwater ice cover on eastern Baffin Island appears either on lakes and rivers or as glaciers. In general, rivers and lakes can be expected to be ice covered by late October. Streams and rivers usually open from late May to the middle of June. Lakes, on the other hand, vary in ice cover from nearly 100% the year around for upland or sheltered locations to completely ice-free, from July into September, for water bodies at low elevation and subjected to relatively high springtime temperatures. Glacier ice occurring within the study region covers about 4,400 square miles of the Cumberland Peninsula and many square miles of the mountainous coastal region north to Clyde River. The largest glacier in the region is the Penny Icecap covering about 2,300 square miles.

Sea ice conditions along the eastern Baffin Island coast are complex and variable. Ice observations, especially for the summer transportation period, are available from aircraft and ships. Walmsley offers a short discussion of these data and a bibliography of the primary references to seasonal ice distribution in Baffin Bay. From these data, plotted for the region of Baffin Bay between latitudes 65° to 78° north, Walmsley was able to calculate variations in the mean annual ice cover as shown in Figure 2. It can be seen that, in general, winds may set the landfast ice adrift in any season, in particular along stretches of exposed coast. Cumberland Sound is usually frozen over by late November or early December. By and large the east coast can be considered closed to navigation by early October. Sea ice travel is possible by late November in most places. Breakup of the landfast ice varies from area to area and one year to the next. Normally, the fjord heads clear in late June. Cumberland Sound can be expected to be free for boat travel from early to mid-July although pack ice can be present throughout the summer. Landfast ice from Cape Mercy to north of Cape Dyer does not always extend seaward beyond the bays and fjords and therefore this coast is sometimes ice free early in July or sooner. From Broughton Island northward to Clyde River the bay ice frequently breaks up by late July. In 1966 landfast ice was present along the entire east coast in early August; Home Bay did not break up until the second week of August and pack ice was present along the coast during the whole summer. Normally, Home Bay is frozen from late October to late July and the coast is free to navigation some time early in August.


MAP 3
WINTER ICE CONDITIONS
SUMMER SURFACE CIRCULATION (VELOCITIES IN CM/SEC.)
CONTINUOUS ICE; NOT IN MOTION.
SEMI-PERMANENT ICE; OPEN PATCHES.
CONSOLIDATED PACK ICE; IN MOTION PART OF WINTER.
UNCONSOLIDATED PACK ICE; IN MOTION ALL WINTER.
0 20 40 60 80 100 120 Miles
70°W
66°W
62°W
70°N
68°N
66°N
NARSALOKOLUK
AKOLEEARKATAK
PINGWASOOK
CAPE CHRISTIAN
CLYDE RIVER
SUPEBAYUKTU
AILAKTALI
CAPE HEWETT
PINERA
TEKIKAIT
EKALUGAD FIORD
CAPE HOOPER
NOLOOEGT
DAVIS STRAIT
KIVITOO
BROUGHTON IS
PENNY HIGHLANDS
PADLOPING IS
CAPE DYER
NETTILLING LAKE
NOONATA
BON-ACCORD
A/ATUKTOO
PANGNIRTUNG
IMIGEN
TESSERALIK
NOWYAKBIK
KINGNAIT
TWAPINE
KEKERTEN IS
SURPEEWEESUKTOO
KEEMEE
IGLOOTALIK
OLITIVIK
KREPISHAW
ABRAHAM BAY
KINGNIKSOO
CUMBERLAND SOUND
CAPE MERCY
AMADJUAK LAKE
12
16
10
16

High tides in the Cumberland Sound region create a zone of broken, rough ice covering the tidal flats. North of Cape Dyer, however, the tidal range is less and the broken ice zone is much reduced in width and roughness. Throughout the region landfast ice terminates seaward in a floe edge between either relatively open water or the moving ice pack of Baffin Bay and Davis Strait. The pack itself can be composed of ice formed locally along the coast, and winter ice and icebergs transported from the northern parts of Baffin Bay and Greenland. Grounded icebergs may sometimes act as anchors that tend to prevent the landfast ice from breaking up or moving in early summer.

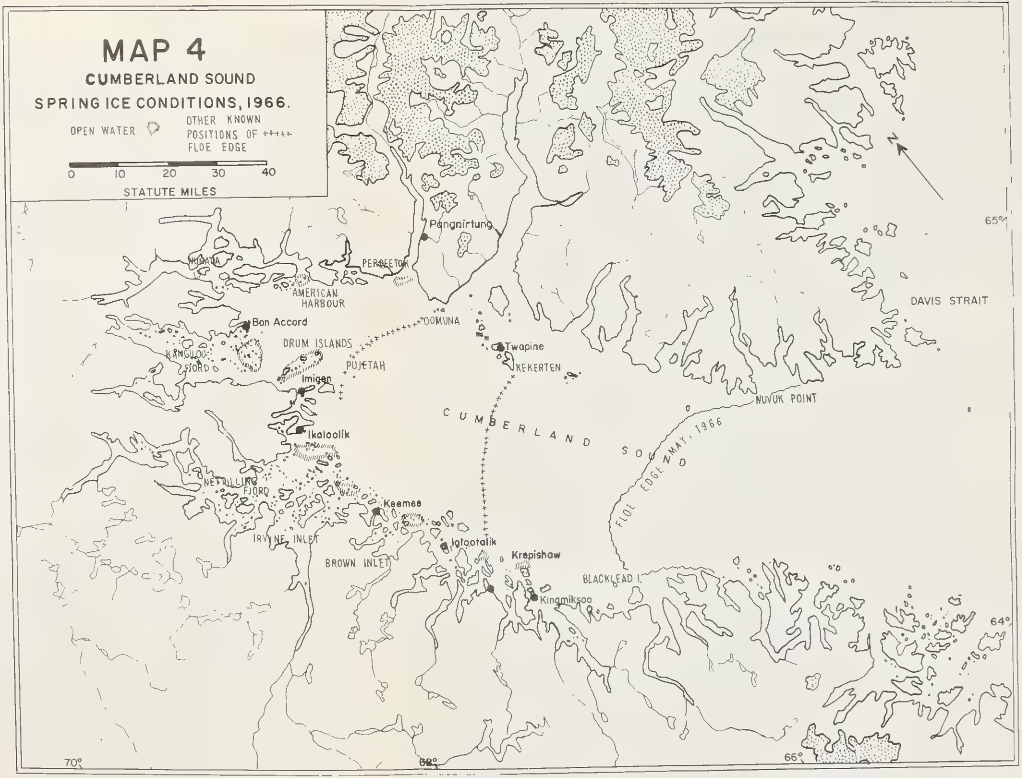
ICE COVER - CUMBERLAND SOUND

Break-up in large and deep fjords occurs at an earlier date than in the sound. In June these fjords are usually open while the sound ice does not move out until mid-July. In the shallow inlets, however, ice may persist until late July. Because of tidal currents, some areas around the islands remain open all year. In these cases the surrounding areas are the first ones to be ice free in spring. Nettilling Fjord is usually navigable much earlier than the sound as the winter ice breaks loose about 12 days earlier. Here the ice free period is from July 20th to November 1st. The tides also aid in the breaking up of the ice along the shoreline so that large areas of open water may exist as early as mid-May.

An example of ice conditions in the summer of 1966 is as follows: by May 17th, 1966, expanses of open water were observed at the mouth of Kangiloo Fjord, around the Drum Islands, at the mouths of Nettilling Fjord and Irvine Inlet and near Keemee, Brown Inlet, Nuvuyen and Ikjuituakjuit. During the survey open water was observed south of Pangnirtung Fjord, American Harbour and Nunata. (See Map 4).

On May 26th a storm occurred in the sound and winds exceeding 50 miles per hour were recorded in Pangnirtung Fjord. The next day a crack five to ten feet wide crossed the solid central ice from Nuvuyen to Kingmiksoo. By June 10th, when looking toward Imigen from the mouth of Pangnirtung Fjord, no ice was seen to the horizon. Large areas of open water existed by June 20th and there was a mass movement of ice floes. Overnight one large floe followed a circular path drifting from the vicinity of Oomuna to approximately 15 miles off Peroeektok. By this date canoes and outboard motors were used extensively.

Ice remained only at the head of the sound on July 9th and almost no ice was encountered in crossing the sound from Pangnirtung Fjord to Nettilling Fjord. In the bays south of Cape Edwards, however, ice persisted until late July. The ice went out of Shulut Bay on July 27th but was still present in one of the bays of Moodie Island on the same date.


MAP 4
CUMBERLAND SOUND
SPRING ICE CONDITIONS, 1966.
OPEN WATER
OTHER KNOWN POSITIONS OF FLOE EDGE
0 10 20 30 40
STATUTE MILES
Pangnirtung
PERQEETOK
NUNATA
AMERICAN HARBOUR
Bon Accord
KANGULOO FJORD
DRUM ISLANDS
PUJETAH
OOMUNA
Twapine
KEKERTEN
Imigen
Ikaloolik
CUMBERLAND SOUND
FLOE EDGE MAY, 1966
NUVUK POINT
DAVIS STRAIT
NETTILLING FJORD
Keemee
IRVINE INLET
BROWN INLET
Igtootalik
Krepishaw
BLACKLEAD I.
Kingmiksoo
65°
64°
70°
68°
66°

In some years, therefore, the sound may be relatively ice free in mid-July but in most years the heavy polar ice enters the sound from Davis Strait and prevents the outward movement of sound ice until the beginning of August. These ice floes from Davis Strait may be as great as two miles wide. Icebergs, transported by the Canadian Current, also enter the sound at Cape Mercy and cross the sound in the vicinity of Kikastan Islands. (Map 5). On the way out of the sound many of these bergs become grounded off the southwest shore.

Winds also play an important part in the movement of ice. Southeast winds will pack the ice against the northeast shore. Northeast winds will block off the southeast coast and when north and northwest winds prevail, the entire sound can be cleared of ice. In periods of calm or light winds the ice movement is determined by tidal currents and the Canadian Current.

Navigation conditions for large vessels between August and October are therefore largely determined by winds and the ice conditions of the Davis Strait pack at the mouth of the sound. For example, the failure of whalers at Blacklead Island to capture a whale was blamed on the great quantities of broken ice that were tightly jammed into the gulf throughout the summer of 1903. In contrast, when Davis, the discoverer of the sound, entered it on August 11th, 1585, he found it altogether free of ice.

In late September and early October ice begins to form in the shallow bays, sheltered coves and inlets. Within the sound freeze-up is delayed as the young ice is soon broken by wind and currents so that a solid cover does not occur until November. In 1923 the Pangnirtung Eskimos hunted on the ice as early as November 12th and the first sledges were used on November 20th on ice that was four to six inches thick. By December 20th the gulf appeared to be frozen solid. When the Florence over-wintered near Bon Accord in 1877, a continuous cover appeared on December 1st of that year. Howgate, who had more than a decade of experience in the area, thought that that date of freeze-up was exceptionally late.

The centre of the sound is covered by an agglomeration of polar ice, local rafted pans and icebergs made fast by the formation of new ice among them. This ice is surrounded by landfast ice and the junction of the two is marked by broken blocks of ice caused by winds and tidal movement (Fig. 3). Significant cracks can occur within the solid cover and this main block of central ice moves with the winds and tides until mid-January. At the head of the sound the ice is stationary. The Eskimos respect this phenomenon and in this period ice travel is restricted to the coast. They will only cross the sound at the narrowest part between Kilauteek Islands and Ushualuk. A myth which explains the migration of the Cumberland Sound Eskimos to Greenland is centered upon the breaking up of the central ice. According to the legend, a large section of ice broke off while some Eskimos were crossing the sound. Strong winds blew the ice out of the sound before the people were able to make their way back to the shore and they eventually reached Greenland.

The strong current between Nuvuk Point and Kaxoudluin Island prevents the floe edge from forming beyond these points. Boas stated that the floe often ran from Kekerten to Nuvuyen and it had been known to extend as far up the sound as the Pujetah-Oomuna line. Thus, the position of the floe edge depends on the stability of the central ice.

On may 13th, 1966 the floe edge extended from the vicinity of Blacklead Island to Nuvuk Point. (See Map 4).

TIDES AND CURRENTS - GENERAL

Results of oceanographic research in the eastern Baffin Island region are summarized by Collin and Dunbar. This work has shown that the entire east coast is influenced by the southward flowing cold, Canadian Current (Map 3). Surface speeds of the current vary from a high of about 20 centimeters per second in summer near Cape Christian and Home Bay, to an annual low at all coastal points in early spring. The annual discharge of water through Davis Strait by the Canadian Current has been estimated to be about two million cubic meters per second. The fact that the current carries cold water southward from the Arctic Ocean has an important influence on the temperature and ice distribution of the region.

Mean Tides and Tidal Currents[1]

Station	Mean Tide (feet)	Tidal Current (knots)
Cumberland Sound	19.2	2
Exeter Bay	5.2	2-3
Durban Island	3.0	4
Broughton Island	3.8	1
Kivitoo	4.5	0.7
Cape Hooper	4.5	2
Ekelugad Fjord	3.5	slight
Patricia Bay	4.5	Unknown
Cape Christian	5.5	1-2

1. As taken from Pilot of Arctic Canada, 1964.

Tides vary from extremely high in the Cumberland Sound region to relatively low along the entire east coast. Of equal importance as the height of the tides are the currents created by tidal movement. Areas noted for strong currents are from Cape Mercy to Cape Dyer and between many of the islands at the north end of Cumberland Sound. Often open water is present in these tide rips throughout the winter.

TIDES AND CURRENTS - CUMBERLAND SOUND

The role of tidal movement is of extreme importance in the study of Cumberland Sound's physical environment. There is a large tidal range with tides of 23 feet occuring at the head of the sound and 25 feet at the entrance to Nettilling Fjord.

These tides create currents which are pronounced in island-congested waters. For example, in Irvine Inlet and Nettilling Fjord the numerous islands act as barriers to the tidal movement causing the water to be channelled through the islands at a swift rate. This funnelling effect can be very dangerous if passage with a small craft is attempted when these tidal rips are at full strength. In the narrow parts of Nettilling Fjord the tidal current prevents the formation of ice. These open water areas, called shabaks in Eskimo, are well known to the Eskimos because ringed seals are often plentiful in such areas during the winter.

Many other channels are so treacherous that passage is attempted only at slack water. Oleeteevik Island, (Map 5) in the McKeand River is known as "the place where one waits for the tide". Fast water is also present in Kangiloo Fjord and at the mouth of Clearwater Fjord near Nunata where there are violent eddies. Strong tidal currents also exist in the vicinity of Cape Mercy and between Nuvik Point and Kaxoudluin Island, the narrowest part of the sound.

Another effect of tidal movement can be seen where tidal flats exist. The constant rise and fall of water breaks the ice into large chunks making travel accross such areas extremely difficult. In some cases a person may be forced to travel along the ice foot; this ice is attached to the land and does not oscillate with tidal movement. During the summer this littoral zone limits the arrival and departure of boats to periods of high tide. This is particularly true of Pangnirtung where the tidal flats are several hundred feet wide.

Little research has been carried out on the main current which enters Cumberland Sound near Cape Mercy. This branch of the Canadian Current penetrates inward on the northeastern side of the sound as far as the Kikastan Islands. From here it swerves across the sound toward Nuvuyen Island and then exits along the southwestern coast. During the summer some ice floes and bergs are brought in from Davis Strait by this current and with this ice comes the occasional polar bear.

SEA WATER SURFACE TEMPERATURES AND SALINITY

Few observations are available to determine the seasonal changes in the surface water temperatures and salinities. In general, the summer water of Cumberland Sound is between one and two degrees centigrade while that of the east coast ranges from two to three degrees centigrade. Salinities vary seasonally with the lowest values to be expected in late spring.

GEOLOGY

A number of geological investigations have been made of the coastal areas from Gibbs Fjord in the north to Cumberland Sound in the south. Kranck has reported on work in the northern area and the general mineral potential of entire eastern region. Clarke conducted a geological reconnaissance of the Padloping Island area in 1964. The principal studies of the geology of the Cumberland Sound area were those by Weeks and Riley. In addition to these studies some prospecting has been done at least in the area from Broughton Island to Kivitoo and near Pangnirtung.

In general, the entire region is composed of Precambrian granite, gneiss and other intrusive and undivided rocks of the Canadian Shield. In addition, there are sedimentary or volcanic rocks, associated with the Canadian Shield, located at the heads of Sam Ford Fjord, Inugsuin Fjord, McBeth Fjord and from Durban Island to Cape Dyer. Outcropping of these same rock types are found in several areas around Cumberland Sound, principally on the northside of Kingnait Fjord, the southside of Kangilo Fjord and at more than half a dozen spots along the south coast as far as the Lemieux Islands. Mineralization often occurs in association with any of these Precambrian rocks.

TOPOGRAPHY - GENERAL

One of the most striking features of eastern Baffin Island is the landscape. It has been the subject of continued research in recent years notably by expeditions directed by P.D. Baird and the Geographical Branch of the Department of Mines and Technical Surveys.

In the southern portion of the survey region the upland of the Hall Peninsula Plateau and Chidliak Hills plunges to Cumberland Sound from elevations of about 2,000 feet. At the north end of the sound the uplands vary in height from a few hundred to over 1,000 feet. From Cumberland Sound northward, however, the region is very mountainous with peak heights ranging from over 6,000 feet on the Cumberland Peninsula to more than 8,000 feet in the Penny Highlands. From Kivitoo northward to Clyde Inlet the mountain peaks reach about 4,000 feet. This entire mountain chain from Cape Dyer to Sam Ford Fjord supports numerous glaciers. Although large expanses of low lying flat land are exceptional they do occur east of Kivitoo, on the Henry Kater Peninsula and form the seaward reaches of the promontories between Isabella Bay and Eglinton Fjord. Westward of the mountainous coastline the topography is lower and consists of gently rolling hills with a mean elevation of from 2,000 to 2,300 feet.

The predominant characteristics of the topography are the many fjords and islands that give rise to long stretches of complex coastline backed by high mountains. Simple, exposed coasts and areas of extensive, flat lowlands are infrequent. The occurrence of lakes within the mountain region is, in general, far less than in the lowlands and areas in the central

island. While many streams and rivers drain eastward from the highlands they are often fed by glacial malt water or reach the ocean over extremely steep gradients.

THE PHYSIOGRAPHY OF CUMBERLAND SOUND

Cumberland Sound, the largest inlet on the east coast of Baffin Island, is 140 miles long and ranges in width from 25 miles near the head of the sound to 40 miles half way up the sound. Its entrance is guarded by Cape Mercy (64° 53'N, 63° 32'W) on the northeast and Hall Island (64° 24'N, 64° 58'W) on the southeast. The northern extremity of the sound lies just above the Arctic Circle.

The terrain surrounding Cumberland Sound has been divided into three physiographic regions. The divisions are: 1) Chidliak Hills, 2) Nettilling Uplands and 3) Cumberland Fjords.

The Chidliak Hills are situated on the southeast side of the coast between Popham Bay and Brown Inlet. In general, this region consists of Hills and plateaus which are dissected by deep valleys, many of which are drowned.

The region can be divided into two sub-regions. The first is from Popham Bay to Chidliak Bay. Here the plateau region reaches right to the sound producing spectacular relief in the form of a cliffed shoreline rising over 2,000 feet out of the sea. Long narrow inlets indent the coastal area. These inlets are separated by ridges which extend to the sound as high peninsulas and large promontories. In time of storm these sheltered waters provide sanctuary and it was in such inlets that the early whalers sought refuge. Moodie Island is an excellent example of this irregular coastline.

The second of the Chidliak Hills sub-regions extends northward from Chidliak Bay where a lower erosion level occurs between the plateau and the sound. Broad open valleys predominate as erosion has left only isolated hills. Shallow lakes are ubiquitous and sand and gravel have been laid down in the valleys or deposited at river mouths as delta terraces. At the plateau edge rivers have been incised and the entrenched valleys make the terrain extremely rugged. The coast is still indented but this is less apparent when viewed from the sound due to the increased frequency of offshore islands. These islands are an introduction to the type of coastline which is found farther north.

Adjoining the Chidliak Hills is the Nettilling Upland region. It extends northward from Brown Inlet and crosses the head of the sound to Shark Fjord. Extensive fracturing, followed by erosion, has produced linear scarps which form the sides of many lakes, inlets and islands. Although the higher areas of this plateau region have an elevation of 750 to 1,000 feet, steep valleys with floors 100 to 200 feet above sea level are common. The upper levels have been stripped of their overburden and rocky terrain is widespread while deposits of sand and boulders in the valleys have left an uneven surface.


MAP 5
CUMBERLAND SOUND
SELECTED PLACE NAMES
0 10 20 30 40
STATUTE MILES
Pangnirtung Fjord
Pangnirtung
Kingnait Fjord
Sirmilling Bay
Shark Fjord
Nunata
American Harbour
Peraoektok
Oomuna
Clearwater Fjord
Bon Accord
Drum Islands
Pujetah
Imigen
Kangiloo Fjord
Twapine
Kekerten Harbour
Miliakdjuin
Tuleruinne Pt.
Cape Mercy
Aktijartukan Fjord
Nuvuk Point
Wareham Island
DAVIS STRAIT
CUMBERLAND SOUND
Ikaloolik
Livingstone Fjord
Kaigosuit Islands
Kaigsuiyat Islands
Keemee
Nuvuyen Island
Nettilling Fjord
Igtaotalik
Krepishaw
Irvine Inlet
Brown Inlet
Oleetivik Island
Blacklead
Kingmiksoo
Cape Edwards
Shulut Bay
Kaxoudluin Island
Moodie Island
Hall Island
Niantillic Harbour
Chidliak Bay
McKeand River
Popham Bay
65°
64°
70°
68°
66°
N

Along the southern coast of this region are innumerable islands located in large bays, inlets and wide fjords. Brown Inlet reaches eight miles into the mainland behind its islands and possesses a large tidal flat. The islands have reduced the effects of wave action and allowed the accumulation of sand deposits near the mouths of the larger rivers. Farther north a large embayment over 15 miles wide is divided by the Kaigosuiyat and Kaigosuit Islands. Irvine Inlet, the southern arm of the bay, is fed by the McKeand River which provides an important route into the interior. In the past this route was a principal communication link between the Eskimo communities on Cumberland Sound and the Frobisher Bay area. Nettilling Fjord is the northern arm of the Bay and it provided a route through the uplands to the Nettilling Lake area. At the head of the sound, drowning of the plateau has created deep inlets and many isolated islands.

The remaining coastal area to the northeast is part of the third physiographic region, the Cumberland Fjords. This region forms the apron of the Penny Highlands and is 20 miles wide in sections with elevations of 2,500 to 3,000 feet. The upland is hilly and rolling in nature and local relief varies from 800 to 1,200 feet. The entrenched valleys and fjords which invade the area are of two characteristic types. The V-shaped valleys are incised a few hundred feet above the main valley and usually enter the latter as hanging valleys. The majority of the main valleys, however, are U-shaped. These have been graded below sea level and have become fjords with the inundation of salt water. Verticle cliffs rise over 2,000 feet from sea level and are modified only by the irregular occurrence of scree slopes.

As with the Chidliak Hills, this region can be divided into two sub-regions. In the first region, northwest of Pangnirtung Fjord, silt and sand washed down from the Penny Highlands has filled and shortened the valleys. These valleys form a rectilinear pattern and the terrain is very similar to the Nettilling Upland. The second region is the remainder of the peninsula facing Cumberland Sound. It is characterized by a cliffed coastline penetrated by a number of fjords. The major one is Kingnait Fjord which extends inland about 48 miles in a northeasterly direction. Both Pangnirtung and Kingnait Fjords provide routes across the Cumberland Peninsula to Davis Strait.

Pangnirtung Fjord may be thought of as the dividing point with regard to the distribution of offshore islands on the northeast coast. Few islands exist to the south. The largest group, the Kikastan Islands, lies at the mouth of Kingnait Fjord and a smaller group is situated off Tuleruinne Point. The next major island is over 20 miles away; it is the stack-like Wareham Island. Northwest of Pangnirtung Fjord the islands are more numerous. They follow the general strike of the peninsula and align themselves parallel to the mainland. These granite masses reach elevations of over 1,500 feet and afford a sheltered route for small boats most of the way between Clearwater Fjord and Pangnirtung.

BIOLOGICAL RESOURCES - GENERAL

Introduction - Food chains in the high latitudes normally contain relatively few species of plants and animals and are therefore considered parts of a simple ecosystem as compared to complex ecosystems in many tropical areas. Whereas the terrestrial ecosystem of the area supports only one large herbivore, the caribou, and one large carnivore, the wolf, a tropical grassland might contain a dozen large herbivores and several large carnivores. Any consideration of biological productivity and biological resource utilization must bear in mind the essential simple nature of the Arctic ecosystem. Relatively few plants are important food sources to the Eskimo population of the survey region. The primary function of the terrestrial and marine plants is to furnish food to herbivorous animals which convert it to protein, fat and carbohydrates. In general, the northern terrestrial ecosystem produces less plant material than the marine ecosystem. Economically most important, however, are the animals. They yield meat and fat for food, oil for fuel, skins and other materials for shelter and equipment and serve as media for the exchange of goods or money. The seasonal abundance and spatial distribution of animals is fundamental to the livelihood of most residents of eastern Baffin Island. Tables 11, 12 and 13 and Figures 4 and 5 give some relevant data on economically important animals and plants.

Whales - The Greenland whale was relatively abundant at most coastal locations in the survey region before the 19th century commercial whaling reduced its numbers. Sightings of the animal in the last decade have increased in frequency suggesting the population is rebuilding. Normally the whales can be expected off Cumberland Sound in early spring, occasional whales are spotted in the sound during the summer and they are regularly sighted at Cape Christian and Home Bay in late summer or early fall. As the whales move south along the coast in September and October they are seen often seaward of Padloping Island and in Cumberland Sound.

White whales are known from most points in the survey region but occur in abundance only in Cumberland Sound, particularly on the south shore off Nettilling Fjord and at the head of the sound. The animals may be considered common to the latter area throughout the summer. Occasional white whales are seen at Padloping Island and usually some pods will pass between Broughton Island and the mainland in early summer. White whales are seldom seen in large numbers in the Clyde River region although they sometimes visit Home Bay in summer.

Narwhal are regular visitors in small numbers to the Cumberland Sound area, they are seldom reported along the coast north to Home Bay but can be considered common from Home Bay north to the Clyde River area. Normally they appear in the northern region from summer to early fall.

Killer whales have been reported from several areas along the east coast but they are most common in Cumberland Sound. Observers at Pangnirtung believe that the species has tended to hunt Cumberland Sound with increasing frequency in the past eight years.

Game reports were analysed for Clyde River and Pangnirtung, as a measure of the occurrence of whales. For the 11 year period, 1955 to 1966, Clyde River reported sightings of narwhal each year, Greenland whales during eight years, white whales in three years and killer whales in one year. Pangnirtung, on the other hand, reported all four species present each year for the period 1958 to 1966. All whale species are absent in winter.

Walrus - Although walrus are not numerous in the survey region they can be considered regular migrants in particular locations. In summer, the animals may be expected to visit the mouth of Cumberland Sound, from the Leybourne Islands to Abraham Bay, the Kivitoo area, Home Bay and the coast near Cape Hewett. Herds of up to 200 animals have been reported in the Leybourne Island area. Otherwise walrus appear in small groups and must be considered occasional visitors along the entire coast. The animal leaves the region in winter.

Polar Bear - Polar bears are known from all coastal locations in the survey region but are most common at points from the Clyde River region to the mouth of Cumberland Sound. When sea ice is present the animals may be sighted in any month. Normally, however, they are most frequent in early winter and least frequent in summer. The areas around Clyde River, Padloping Island, Exeter Sound, Hoare Bay and the outer coasts of Cumberland Sound are considered regions where polar bears are common from early winter to spring. Dens and female bears with young have been reported from the Home Bay and Clyde River region.

POLAR BEAR SKINS TRADED AT CLYDE RIVER

Year	Number of Skins	Year	Number of Skins	Year	Number of Skins
1943	36	1951	10	1959	40
1944	18	1952	17	1960	60
1945	6	1953	25	1961	69
1946	6	1954	31	1962	58
1947	15	1955	30	1963	40
1948	13	1956	52	1964	40
1949	17	1957	16	1965	65
1950	17	1958	27	1966	13

Seals - Two seal species, the hooded and harbour seals, can be considered occasional or rare visitors to the survey region. Harbour seals have been reported from Cumberland Sound and the Clyde River area while hooded seals are seldom, if ever, seen at any coastal points

The harp seal is known throughout the survey region although it is most commonly seen in the Cumberland Sound region. Normally the animals appear in late summer and tend to congregate at the western end of the sound. Clusters of animals have been reported near ice in the centre of the sound and occasional harps may be observed at all points along the east coast from Hoare Bay to Clyde River. Over 92% of all seals seen in the Home Bay - Cape Hooper region were ringed seals while less than one per cent were harp seals.

Bearded seals also occur throughout the survey region. In summer the animals are often seen along the coasts of the outer reaches of Cumberland Sound and along the entire east coast. About six per cent of all seals seen in the Home Bay - Cape Hooper region were bearded seals. These data agree well with seal census reports from southwestern Baffin Island and Frobisher Bay (McLaren, 1958). The animal is absent from areas of winter landfast ice but it is occasionally seen at the floe edge, particularly in the Leybourne Island region off Cumberland Sound.

The ringed seal is the most common species, in total numbers, season of occurrence and geographical distribution of all seal species known from the survey region. Because of its ability to feed on a relatively large number of different food species, the animal is not limited in range or abundance by food. It has an affinity for sea ice, however, and occurs in larger numbers in regions of complex coastline with wide aerial expanses of fast ice than along simple coasts bordered by small areas of fast ice. Ringed seal may be considered present in all seasons.

The numbers of hooded and harbour seals in the survey region are very small. Harp seals occur in relatively large numbers and are of economic importance. Because there is no accurate measure of the seasonal abundance of this species the figure given above must be used as the best approximation of its occurrence relative to ringed seals in the northern region. It is more abundant in Cumberland Sound, however. The numbers of bearded and ringed seals in the survey region can be obtained from the model developed by McLaren. He has estimated that the coast from Cape Henry Kater to Cape Dyer should support about 75,000 ringed seals and about 2,000 bearded seals. The region from Cape Dyer to Leopold Island should sustain about 28,400 ringed seals and perhaps 1,200 bearded seals. Cumberland Sound, from Leopold Island around to Hall Island, should support 68,600 ringed and about 2,000 bearded seals.

Terrestrial Mammals - The caribou is the most important land mammal occurring in the survey region. Although their range was once more extensive than at present, reports of sightings and the annual kill of animals suggest the species is increasing in numbers or extending its range into the eastern portions of the island. Caribou are frequently seen to the west and south of Cumberland Sound; they are seldom seen on the Cumberland Peninsula but they occur in relatively large numbers from Home Bay to north of Clyde River.

Wolves, the primary predator of the caribou, appear to be most common in the Home Bay to Clyde River region. They are rarely reported from Kivitoo southward throughout the Cumberland Peninsula but increase in numbers to the west and south of Cumberland Sound. Wolverine, once present in the survey region, are now extremely rare.

Arctic fox are common in all parts of the survey region except during cyclic periods of low population levels. Red fox have been trapped in the Cumberland Sound area but they are not reported from regions farther north.

Fish - Little scientific research has been conducted on the various species known from the survey region, or on their geographical distribution and abundance. An unidentified species of trout has been reported from the west end of Cumberland Sound and lake system inland from Kivitoo. Relatively large cod fish, again species unidentified, have been reported from Padloping Island and near Cape Hooper. Small polar cod are known from most places in the survey region but no data are available on their seasonal abundance. Arctic char are also reported to be present at many sites from Cumberland Sound to north of Clyde River. Those places known to support relatively large char populations are shown on Map 6. While winter char are taken at the western end of Cumberland Sound, Padel Fjord and McBeth River, the main run of fish normally comes to all areas some time in August.

Birds - A number of bird species frequent the survey region but none of them can be considered of significant economic importance. Ptarmigan are often encountered in most inland areas. Eider ducks nest in scattered groups along the coast with only one relatively large concentration in the Duck Island area north of Padloping Island. A large murre colony north of Cape Dyer supports several thousands of birds. Geese, the Canada and Snow goose and Brant, are seasonal migrants through the region but apparently do not breed in large numbers along the east coast.


MAP 6
POTENTIAL RESOURCES
ARCTIC CHAR
RINGED SEALS
WHITE WHALES
POSSIBLE TRAVEL HUTS
POSSIBLE LIGHT AIRCRAFT EMERGENCY FIELDS
SOAPSTONE
0 20 40 60 80 100 120 Miles
70°W
66°W
62°W
70°N
68°N
66°N
DAVIS STRAIT
CUMBERLAND SOUND
NAKSALOKOLUK
AKOLEEARKATAK
PINGWASOOK
CAPE CHRISTIAN
CLYDE RIVER
SUPEGAYUKTU
AILAKTALI
CAPE HEWETT
PINERA
TEKIKAIT
EKALUGAD FIORD
CAPE HOOPER
NOLOOEET
KIVITOO
BROUGHTON IS.
PENNY HIGHLANDS
PADLOPING IS.
CAPE DYER
NETTILLING LAKE
NOONATA
BON ACCORD
AVATUKTOO
PANGNIRTUNG
IMIGEN
IKALLOOLIK
NOWYAKBIK
TESSERALIK
KINGNAIT
TWAPINE
KEKERTEN IS
SUMPEEWEESUKTOO
TUAKJUAK
KEEMEE
IGLOOTALIK
OLIFIVIK
KREPISHAW
KINGNIKSOO
ABRAHAM BAY
CAPE MERCY
AMADJUAK LAKE

THE BIOLOGICAL RESOURCES - CUMBERLAND SOUND

RINGED SEAL

Season of occurrence - The ringed seal is a year-round resident of Cumberland Sound. Because this species is able to maintain a breathing hole through the thick fast ice, it does not have to move to open water during the winter months. In fact, the distribution and abundance of these seals is primarily governed by fast ice*. In order to pup, the adult females require stable ice with suitable snow cover. Since the destructive effects of the winds and tides upon ice are greatest near the floe edge, the adult seals attempt to move well into the fast ice areas with the onset of freeze-up. Here there is less chance of separation of mother and pup during the two month weaning period. Consequently the majority of the seals in the fast ice are adults while those found at the floe edge are immature (one to five years old). This fact was borne out by Kumlien as early as 1879, who stated that no immature seals were killed in the tide rips at the head of the sound during the winter season.

By early March most of the pregnant females have chosen the locations for their birth lairs and pupping takes place between early March and mid-April. With break-up many immatures now begin to move into the fast ice via leads, cracks and open water areas created by thaw.

The Eskimos report an annual tendency for netsiavinuk or silver jars to congregate in certain areas of the sound. The men make special journeys to such places to hunt the young seals. In 1966, for example, the inhabitants of Keemee and Krepishaw moved to an island near Brown Inlet for several weeks in order to take silver jars. Other areas where netsiavinuk are numerous are around Nuvuyen and Moodie Islands. An examination of a sample kill of 11 seals in the latter location at the end of break-up showed that 9 of these were netsiavinuk.

When the ice moves out of the sound seals of all ages tend to move toward the coastline and the majority of the animals are found within an estimated three miles of the shore. McLaren's ten mile limit from the coast for their dispersal extent should also apply to Cumberland Sound. There is an exception to this general movement, however, as some of the seals move out of the sound with the ice. Figure 6 shows the theoretical seasonal distribution of ringed seals in the sound.

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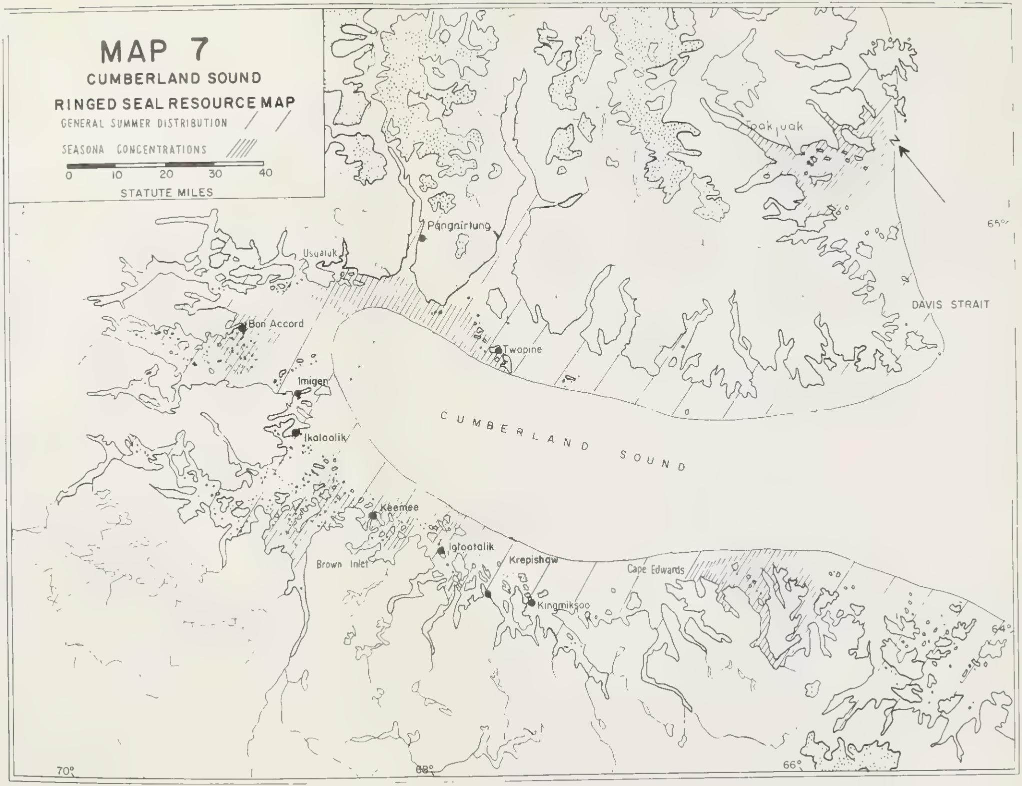
* The ringed seal varies its diet greatly, feeding on planktonic, necktonic or benthonic organisms. Thus, type of food is not a limiting factor in the distribution or abundance of this species (McLaren, 1961 a).


MAP 7
CUMBERLAND SOUND
RINGED SEAL RESOURCE MAP
GENERAL SUMMER DISTRIBUTION
SEASONA CONCENTRATIONS
0 10 20 30 40
STATUTE MILES
Pangnirtung
Usualuk
Toakjuak
N
65°
DAVIS STRAIT
Bon Accord
Twapine
Imigen
Ikaloolik
CUMBERLAND SOUND
Keemee
Iglootalik
Krepishaw
Brown Inlet
Cape Edwards
Kingmiksoo
64°
70°
68°
66°

Places of abundance - Based on observation and Eskimo reports, the areas where seals were plentiful during the 1966 season are as follows: during break-up there were large numbers of ringed seals in the area between Kikastan Islands and Usualuk, at the mouth of the McKeand River, and around Nuvuyen (Map 7). For most of the month of July they were abundant around Bon Accord, near Opernavik, and along the coast south of Cape Edwards. In the waters around Toakjuak, on Davis Strait, however, they were reported to be plentiful the year round. During the months of August and September ringed seals became scarce in the upper half of the sound forcing the hunters to make longer trips down the sound to better hunting areas.

Migration Theory - Although the ringed seal is considered to be a sedentary mammal, many of the Eskimos attribute the scarcity of ringed seal during the late summer to an annual emigration from Cumberland Sound. According to these people, some seals leave at the end of July and during the month of August. A general decline in the sales of sealskins in late summer (Figure 7) and the scarcity of seals, especially in September, supports this theory of migration. Furthermore, numerous seals were observed on ice floes in the middle of the sound between Blacklead and Miliakduin Islands on July 11th. These ice floes were moving out of the sound and were approximately 15 miles from shore. This indicates that some of the migratory seals follow the ice when it leaves the sound. The Eskimos are aware of this and will travel as much as 15 to 20 miles in their whaleboats to hunt around this ice.

The natives also assert that there is an influx of seals in October. These seals are reportedly immature and come from the Davis Strait waters north of Cape Mercy. Unfortunately, no distinction is made between adults and immature seals, (except for silver jars) in the fur trade books and the age of these seals yet remains to be determined scientifically. This immigration of seals in October is shown in the sharp rise in sales of sealskins. It may be argued that the skins were held back until October in order to buy enough supplies to last over the freeze-up period. However, there was no evidence of stockpiling as late as September 10th. Also, in September many of the Eskimos from the camps visit Pangnirtung for a few weeks and while in the settlement they trade as usual.

Reduced losses of seals due to sinking may be advanced as another argument to explain increased sales, but the difference in the number of seals that sink between September and October should be extremely small.

The significance of the increase is accentuated when one considers the number of hunting hours per day. In October longer periods of darkness shorten the length of the hunting day. Since the method of hunting does not change from the two previous months, one would therefore expect the kill to decrease with fewer daily hours of hunting. However, in October the sales of sealskins increase, at times doubling those of September (Table 14). This rise, therefore, can best be explained if the seals have become more plentiful.

Sinking - In April the ringed seal begins to haul out of the water to bask in the sun. This tendency increases as the season progresses and reaches a peak by the end of break-up. During this period of basking there is a corresponding decline in the feeding activity of the seal which results in the reduction of its blubber layer. Since blubber has a low specific gravity the density of the seal increases. Thus, many of the seals that are killed in the water during the break-up and summer seasons will sink before they can be retrieved.

The other factor determining whether a seal will sink is the density of the water in which it is killed. Seals killed in areas where the water is less saline (e.g. near river mouths) have a greater tendency to sink. In 1966 they were reported to sink in numbers near the mouth of the McKeand River.

Data collected from hunting trips carried out during the spring and summer of 1966 show that the greatest percentage of ringed seal losses due to sinking occurred in the two week period immediately following the departure of the ice from Cumberland Sound, i.e. just after the peak of the basking season. After the ice is gone the ringed seals resume feeding and there is a gradual increase in blubber thickness. This, therefore, accounts for the decrease in seal losses due to sinking. Also, after the ice has gone, the water is mixed to a greater degree and there are fewer concentrations of low density water.

Upon comparing Table 17 with a previous study by McLaren it is seen that the peak of sinking occurs approximately at the same time but in Cumberland Sound maximum sinking is only one half that found by McLaren (Figure 13). Differences in local water densities and length of basking season may account for this.

In examining the percentage of sinking losses for ringed seals between June 12th and July 11th it should be pointed out that the percentage of seals killed on the ice is unknown because these data were collected mainly by means of questionnaires. However, personal observations showed that 21.5% of the seals killed in the water between July 2nd and July 11th sank. Although the sample number is small it is believed that these percentages are more representative than the respective percentages of 15.5 and 17.4 also presented in Table 17.

Numbers and Take - The Theoretical population of ringed seals in Cumberland Sound, based on the amount of fast ice, has been estimated by McLaren to be 68,600. But it is important here to mention the role of the central ice. As discussed previously, this ice generally becomes consolidated and ceases to move after January. Therefore, by March it is quite stable and it provides an additional area suitable for pupping. If we include the central ice area and use the figure of five seals per square mile, which is the number of seals that McLaren has assigned to poor fast ice greater than one mile offshore, we then increase the seal population by 5,500. According to estimates based on stable ice, therefore, the population of ringed seals should be 74,100.

McLaren has stated that in order to ensure a constant population the annual kill must not exceed 8% of the total seal population. For Cumberland Sound, then, not more than 5,900 should be killed yearly. Yet, examination of the fur records (Table 14) shows that since 1962 a total of more than 15,000 ringed seals have been traded in excess of this quota. In addition, the number of sealskins used for domestic purposes and the number of seals lost because of sinking amounts to another 8,000* over the four year period 1962 - 1965. In other words, almost 6,000 seals have been killed annually in excess of the sustainable yield, i.e. twice the sustained yield.

That a large reduction has occurred is uncertain, however, for it is not known to what extent the immigration from outside areas has lessened the impact of the large annual kill. Furthermore, large yields in the past (Table 17) appear to have caused no serious effects on overall ringed seal population. If further studies show that there has been no reduction of population then perhaps the central ice in Cumberland Sound supports a greater population than expected.

HARP SEAL

Season of Occurrence - During the winter and early spring months the harp seals (kairolik) are found on the ice off the Newfoundland coast and in the Gulf of St. Lawrence. It is in these southern areas that the pups are born. In May the adult seals leave for the north and are followed by the immature seals (bedlamers) a few weeks later. In the mass migration north through Davis Strait and Baffin Bay, a small number of these seals move into Cumberland Sound. Reaching the area in June, they proceed up the sound when break-up occurs making their way between the ice floes. One of the first harp seal kills of 1966 took place off Pangnirtung Fjord on June 11th. During the summer they are found throughout the sound and appear more frequently than the ringed seals in waters greater than one mile offshore. When the ice forms in the late fall they begin to leave for the southern waters.

Places of Abundance - In late June these seals were numerous off Peroeektok** and on July 12th an estimated 600 harp seals were seen which had hauled out on two large ice floes in the middle of the sound between Miliakdjuin and Blacklead Islands. Many harp seals are also reported to frequent Popham Bay during the month of July. In August the seals are abundant in Kangiloo Fjord as far as Imiyoomee and during October they are reported in numbers around Kingmiksoo.

As the fast ice begins to form at the head of the sound the harp seals retreat with the advance of the floe edge. In December they are reported to be plentiful around Kekerten and they are hunted here until mid-January at which time almost all the harp seals have left for the south.

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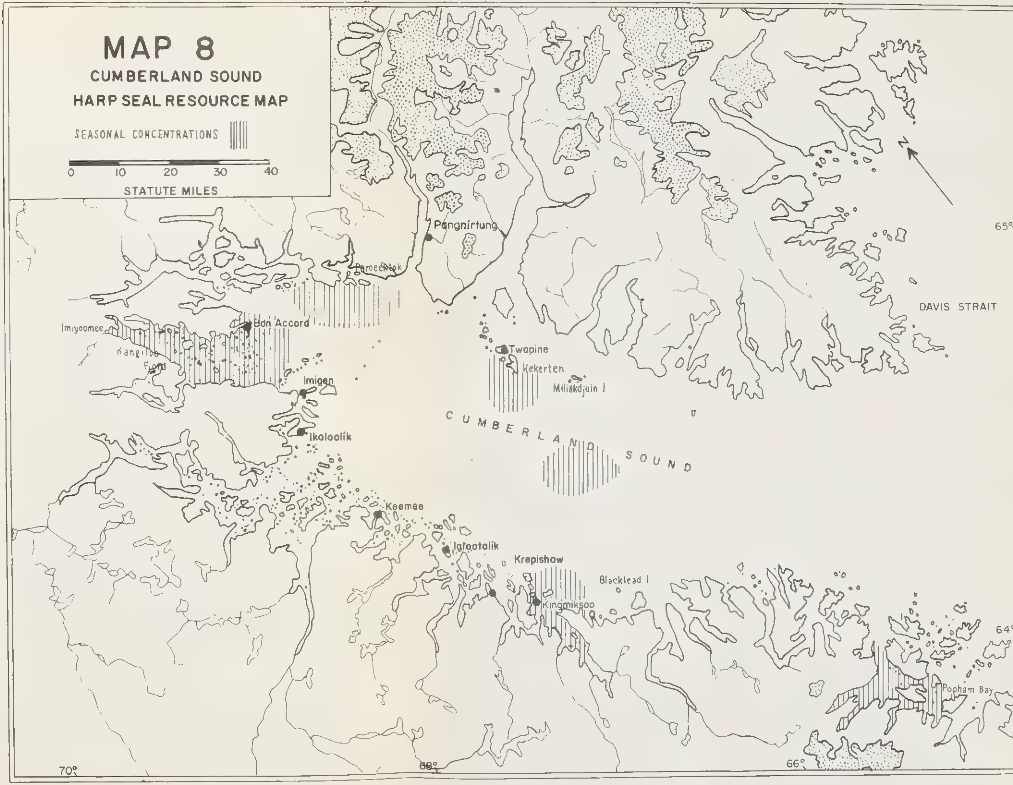
* This figure was calculated by estimating the annual domestic use of the ringed seal skin for Cumberland Sound to be 1,000 and calculating sinking losses during the four year period by multiplying the total number of ringed seals killed from spring to fall by 21.6% (Table 15).

** The abundance of this species in the area may be due to the apparently large quantities of fish. The stomachs of the harp seals caught in the area were full of small polar cod (about three inches long) and in one stomach 72 polar cod were found.



MAP 8
CUMBERLAND SOUND
HARP SEAL RESOURCE MAP
SEASONAL CONCENTRATIONS
0
10
20
30
40
STATUTE MILES
Pangnirtung
Bon Accord
Imiyoomee
Kangiloo Fiord
Imigen
Ikaloolik
Twapine
Kekerten
Miliakdjuin I
CUMBERLAND SOUND
DAVIS STRAIT
Keemee
Iglootalik
Krepishow
Blacklead I
Kingmiksoo
Popham Bay
65°
64°
70°
68°
66°
N

Stragglers - According to Sergeant non-breeding adults and immature harp seals do not have to go south to moult and it is conceivable that a few remain north in areas of open water. Taking into account the delay from kill to time of trading, sales of harp seals, albeit very small throughout the winter months, suggest that a few stragglers may remain in Cumberland Sound in the winter (Table 16).

Sinking - Variation in blubber thickness of the harp seal is somewhat different than that of the ringed seal. When the harp seals first arrive in Cumberland Sound after having completed the long journey from the south, the thickness of their blubber layer is at a minimum. At this time most of these seals will sink upon being shot. During their stay in Cumberland Sound intensive feeding increases their blubber thickness so there is a steady decrease in sinking losses (Table 15) until October when the harp seals are reported to float when killed.

That losses of the harp seals are much greater than the ringed seal during the break-up period can also be attributed to the fact that almost all the harp seals are killed in the water whereas some of the ringed seals are killed on the ice and have no chance to sink unless they slide back into the water.

Numbers and Take - As no previous estimate existed concerning the number of harp seals to visit Cumberland Sound, one was attempted on the basis of the ratio of harp to ringed seals seen. Counts were started as soon as the first harp seals arrived at the head of the sound and were continued until September. These counts were taken on random days and in randomly chosen areas. The 600 harp seals, however, seen on the ice in the middle of the sound (mentioned earlier) were not included in the calculations. In total, 185 harp seals were seen as compared to 148 ringed seals; i.e. approximately $1\frac{1}{4}$ as many harps were seen (Table 19).

Harp seals were not recorded in the fur trade books until June 1965 and in the first year 379 were traded. In the second year, however, 243 were killed in the first month alone. Until 1965 the harp seals that were killed were used for domestic purposes: because of its size its main use was as a sleeping sheet. Today, however, the harp seal skin is more valuable than a ringed seal skin and this custom has been abandoned; almost all harp skins are now traded. These seals were not hunted intensively because there was little chance of retrieving sinking seals when hunting with slow boats. However, with the use of large outboard motors the numbers traded should continue to increase.

Past Distribution - The distribution and travel patterns of these seals in the sound appear to have changed since Kumlien's time. He wrote that this species was only "occasionally found as far up the sound as Annanactook (near Bon Accord) but mostly the young". In 1966 they were abundant at the head of the sound and upon examination of a sample kill, 10 out of 10 were found to be adults*. Apparently the duration of the harp seals' stay in the sound has also increased because Kumlien stated that they disappeared at freeze-up and returned in the spring for only a short time.

BEARDED SEAL

Only on rare occasions will bearded seals (oojuk) maintain a breathing

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* Only 2 of more than 40 harp seals examined throughout the summer were bedlamers.

hole through the ice; normally they live in open water during all months. In winter, therefore, they are found in large numbers below Kaxoudluin Island where currents prevent many areas from freezing over. When break-up commences many of these seals move up the sound reaching the vicinity of Bon Accord by the end of June. They stay at the head of the sound until the formation of the fast ice in the late fall which forces them to move back to their winter quarters.

The bearded seals probably do not dive deeper than 50 fathoms and they are therefore usually found in the shallow water along the coastline. However, on July 12th, 1966 a bearded seal was seen on an ice floe in the middle of Cumberland Sound. The hydrographic chart shows the depth of the water to be at least 400 fathoms.

In general the bearded seal is not abundant in the sound and only an estimated 150 are killed annually, most of these skins being kept for domestic purposes. During the summer of 1966 bearded seals were seen in the following areas; Clearwater and Kangiloo Fjords, the waters around Bon Accord and Twapine, Brown Inlet, Shulut and Neptune Bays (Map 9).

In estimating the population of bearded seals in Cumberland Sound McLaren's (1958a) model based on the ratio of bearded seals to ringed seals is accepted but the number is modified to account for the ringed seal population found in the central ice. The population for Cumberland Sound should be about 6,000.

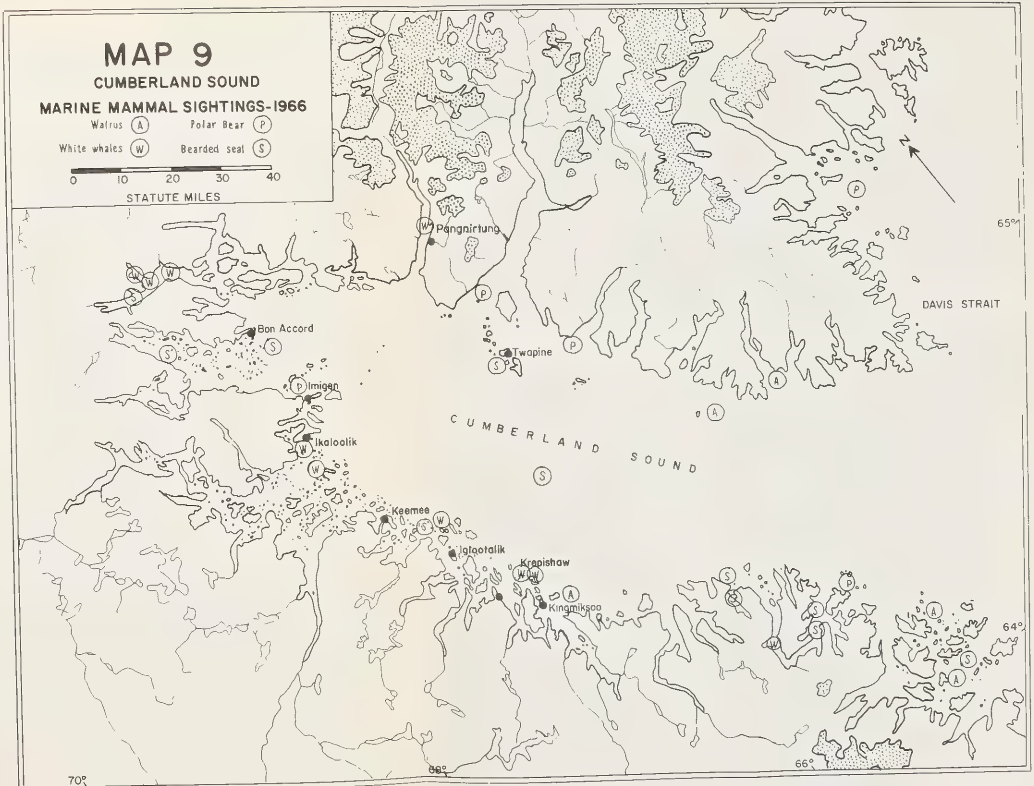
WHITE WHALES

The white whales do not penetrate Cumberland Sound until much of the ice has moved out. They, therefore, reach the head of the sound three or four weeks after the harp seals. One of the first kills of the 1966 season took place seaward of Brown Inlet on July 9th and four days later about 100 whales were seen near Kingmiksoo. With the formation of ice in the late fall the whales leave the sound.

Although these whales can be found throughout the sound in the summer they occur in the largest numbers in Clearwater Fjord where, in July and August, hundreds of whales may be seen at one time. Map 9 shows specific areas where whales were sighted during the summer of 1966. As the main method of hunting these whales is to shoot at them from moving boats, the undertaking becomes very expensive as upwards of 45 shots are fired before a whale is killed. Therefore, despite the relative abundance of the white whale, it is estimated that fewer than 60 are killed annually by the Eskimos.

POLAR BEARS

In the Cumberland Sound region there are two principal areas where polar bears may be found; these are on both sides of the entrance to the sound. Of these two areas, bears are more numerous around Cape Mercy. It is very seldom that polar bears will stray very far up the sound and they usually remain east of Blacklead Island on the south coast and Kekerten in the north. In February 1966, however, three bears were killed near Imigen Island (Map 9). In March many bears are reported in the Neptune Bay area and in late summer the occasional one is found near the Kikastan


MAP 9
CUMBERLAND SOUND
MARINE MAMMAL SIGHTINGS-1966
Walrus A
Polar Bear P
White whales W
Bearded seal S
0 10 20 30 40
STATUTE MILES
N
65°
64°
70°
68°
66°
DAVIS STRAIT
CUMBERLAND SOUND
Pangnirtung
Bon Accord
Twapine
Imigen
Ikaloolik
Keemee
Iglootalik
Krepishaw
Kingmiksoo

Islands. The bears found in the latter area have come with the small floes and bergs brought in by the current. Because of their relative scarcity in the sound proper an average of 15 bears are killed annually (Table 20).

WALRUS

On the northeast side of the sound walrus can be found around Abraham Bay, Wareham Island and in Ugjuktung Fjord (Map 9) where there is a hauling out site (ugli). According to some Eskimos the walrus in this area are predominantly female. These walrus rarely go further up the sound although 50 years ago they were killed as far up as Kingnait Fjord. In the 1800's, the range of the walrus was much greater for they were common at the head of the sound (Kumlien, 1879).

The Leybourne Islands, off the southwest coast, are another area where walrus are found. It is around these islands that the R.C.M.P. hunt walrus for their yearly supply of dog food. In 1966 the farthest reported point of penetration of walrus in Cumberland Sound was near Kingmiksoo.

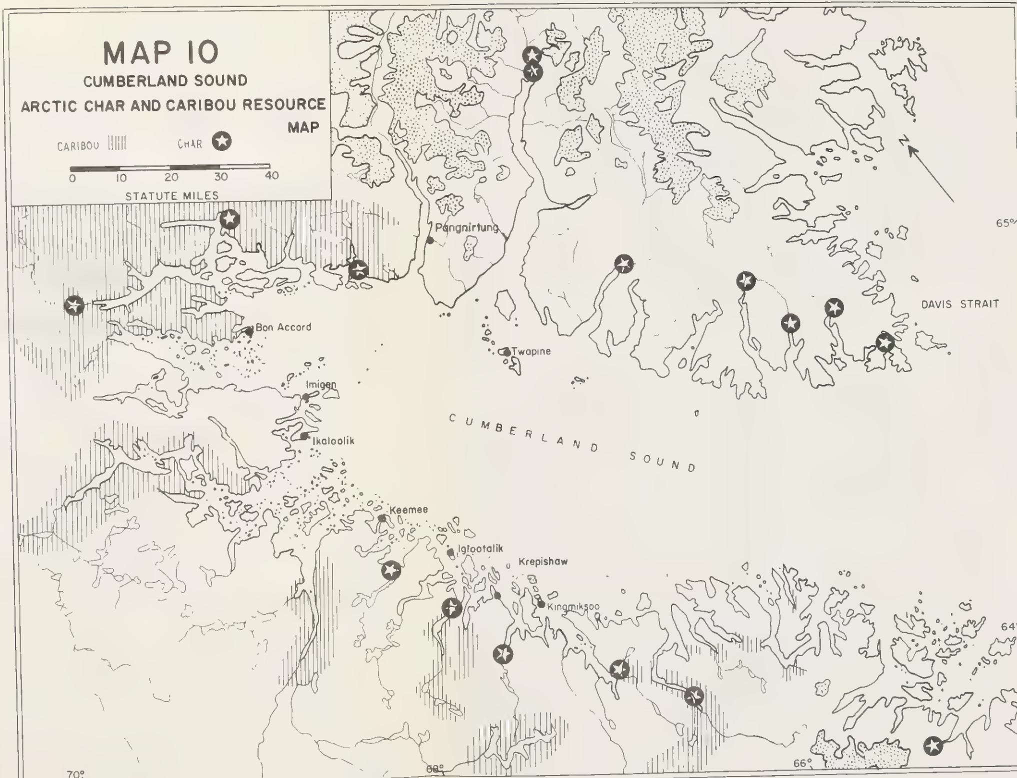
Of the annual walrus kill a quota of twelve are taken by the R.C.M.P. It is not profitable for the Cumberland Sound Eskimos to hunt walrus because of the great distance to these areas. Furthermore, except for the tusks which may be used for carvings, the walrus has no commercial value.

ARCTIC CHAR

Both the anadromous and the landlocked char are present in the Cumberland Sound region. Map 10 shows the lakes and rivers where these fish occur in large numbers. In spite of the abundance of this resource little fishing is carried on by the Eskimos as these people are primarily seal hunters. Because of this most of the stock remains untouched. Most of the fishing that is done is carried out during the annual run of the anadromous char in August. As they begin to ascend the rivers they are netted or speared.

CARIBOU (*Rangifer arcticus*)

Caribou are most numerous in the interior between the head of the sound and Nettilling Lake (Map 10). Large numbers are also found in the foothills below the Penny Highlands. However, on the Cumberland Peninsula, south of Pangnirtung Fjord to Cape Mercy, they are very rare. On the west coast of Cumberland Sound caribou are present at the heads of some of the fjords and river valleys during the summer. In these areas this animal is most frequently found along the shores of Kasigeetdjen Fjord. At any one time the numbers found in these places are small; the largest herd reported during the author's stay numbered 12.


MAP 10
CUMBERLAND SOUND
ARCTIC CHAR AND CARIBOU RESOURCE MAP
CARIBOU
CHAR
0
10
20
30
40
STATUTE MILES
N
Pangnirtung
Bon Accord
Twapine
Imigen
Ikaloolik
CUMBERLAND SOUND
DAVIS STRAIT
Keemee
Iglootalik
Krepishaw
Kingmiksoo
65°
64°
70°
68°
66°

The caribou population appears to have declined since the 1920's. In 1925 Soper reported that caribou were fairly common in Pangnirtung Fjord with herds of 50 not unusual and on a trip through Kingnait Pass he sighted 70 caribou. However, from 1930 to 1966 no caribou were killed in Pangnirtung Fjord and they are extremely rare south of that Fjord. Nevertheless, it is possible that these animals are returning to the area as caribou tracks were seen at the head of the fjord in 1963 and in September 1966, 14 caribou were killed a few miles north of the fjord. The annual kill is found in Table 20.

ARCTIC FOX (Alopex lagopus)

During the winter of 1965-66 Arctic fox were very scarce in the Cumberland Sound region and only 21 were traded into Pangnirtung. However, during the cyclical periods of high population they were common in most parts of the interior. Table 20 includes the annual kill records since 1962.

OTHER RESOURCES

Notes on the birds in the study area have been prepared by Kumlien (1879), Soper (1925) and Irving (1961). Eider duck (Somateria mollissima), old squaw (Clangula hyemalis) and black guillemots (Cepphus grylle) are the principal birds killed for food. But as they are hunted with .22 and .222 calibre rifles rather than shotguns, the numbers taken annually are small. In addition, some birds' eggs are also collected for food.

During the field season of 1966 there were no reports of narwhal (Monodon monoceros) killings and only two sightings were reported; one was near Kingmiksoo and the other near Imigen. For previous annual kills see Table 20.

Hooded seals (cystophora cristata) have all but disappeared from the sound although in the 1920's they were frequently found near the Kikastan Islands. Only two killings have been reported since the late 1950's, one of which was near Bon Accord.

Lastly, the ranger seal (Phoca vitulina), although common in the past is now only an occasional visitor to Cumberland Sound and only one of these seals was killed in 1966.

THE HISTORICAL BACKGROUND

HISTORY - CUMBERLAND SOUND

Pre-history - Although it is not certain whether there are house ruins of the Dorset culture in Cumberland Sound, the finds at Cape Dorset, Frobisher Bay and northeast of Padloping Island, suggest a high possibility of their presence in the sound.

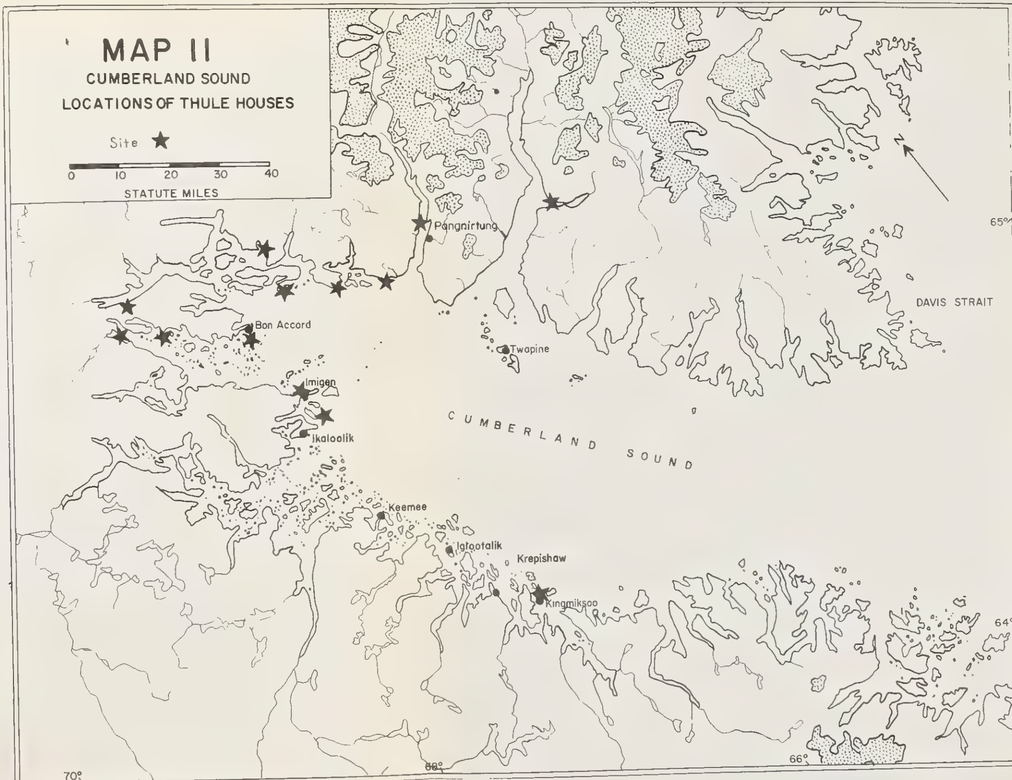
It has been proved, however, that before the coming of the Europeans, Cumberland Sound was populated by the people of the Thule whaling culture. Whalebone ruins, evidence of the culture, are scattered throughout the sound. Boas mentions a few sites and Duval knew of at least ten sites in the sound. The location of the known sites appears in Map 11.

The large number of Thule ruins can be attributed to the abundance of bowhead whales that once frequented the sound. According to Low the whales were found in front of the floe edge in March where they remained until the beginning of May. They then crossed Davis Strait to the Greenland Coast and by June were south of Disko Island. From here they moved northward to Melville Bay before crossing to the western side of Baffin Bay, and Lancaster Sound. They would then swim south and by October would reach Cumberland Sound again. They stayed there, remaining near the edge of the new forming ice until December when they left the sound to return again in March.

The abundance of this marine mammal allowed the Thule culture to flourish. When the European whalers arrived in the nineteenth century, however, this culture had disappeared and had been replaced by the central Eskimo tribes.

Discovery - Around the year 1000 A.D. a land called Helluland was discovered by Icelanders on a voyage from Greenland. Tryggvi Oleson suggests that the sagas' description of the country as a land with glacier covered mountains, huge flagstones, and devoid of vegetation can only be that of Baffin Island. As Cumberland Peninsula is the closest part of Baffin Island to Greenland, it is quite possible that the Norsemen may have entered Cumberland Sound.

The first recorded discovery of Cumberland Sound, however, was by John Davis who entered it in 1585. Returning two years later, he sailed to the head of the sound and named the islands he found there the Erle of Cumberland Isles. In 1616 William Baffin called the land to the north of the sound Cumberland Island thereby starting a confusion of names and places which was not to be clarified for over 200 years. Although a map of 1662 shows the general shape of the sound correctly, a map dated 1743 portrayed the sound as a strait which


MAP II
CUMBERLAND SOUND
LOCATIONS OF THULE HOUSES
Site
0
10
20
30
40
STATUTE MILES
Pangnirtung
Bon Accord
Twapine
Imigen
Ikaloolik
CUMBERLAND SOUND
DAVIS STRAIT
Keemee
Igtootalik
Krepishaw
Kingmiksoo
N
65°
64°
70°
68°
66°

cuts through to Foxe Basin. In the latter map an arm of the sound is shown extending southward to Hudson Strait.

Whalers - There is no other recorded voyage to Cumberland Sound until 1818 when John Ross tried to enter the supposed strait and was unable to do so because of bad ice conditions. The next recorded entry occurred in 1839 when Captain Penny, in charge of a whaling expedition, named the inlet Hogarth Sound. This late date of re-entry can be questioned. The abundance of whales in the waters of Davis Strait was well known by the whalers and as early as 1749 the Dutch alone had 41 ships fishing the area. Also, in a discussion of the Davis Strait fisheries, Scoresby suggested that the ships should follow the whales north and attack them in the latitude 65° or 66° where they were known to halt occasionally. Furthermore, according to Milne, a whaling agent at Kekerten, Penny may have established a station in the sound as early as 1820. In 1841 Wareham, Master of the Lord Gambier, sailed into this same inlet naming it the Northumberland Inlet and his description leaves no doubt that it was the same sound as discovered by Davis.

After 1840 knowledge of the abundance of whales in Cumberland Sound spread rapidly and more and more ships frequented these waters. Between 1846 and 1852 the Americans sent one ship to the sound every year, and each year between 1853 and 1858 they sent five. The English and Scottish whalers returned home every year but the Americans used small schooners and with provisions for two years they were able to over-winter. By wintering near the floe edge at such places as Niantillic or Kingmiksoo they were able to get an early start on the whaling. H.W. Howgate was present in 1851 when the first group of whalers spent the winter in the sound.

During the late 18th and early 19th centuries, the depletion of the whales in the Greenland Sea caused the whalers to focus their activities on Davis Strait and Baffin Bay. On their way home from hunting in the more northerly waters, the English and Scottish whalers would call in at Cumberland Sound and remain whaling in the sound or near its mouth as long as the ice would allow them to do so. If the voyage to the northern areas was unprofitable, it was the custom to call in at the sound and attempt to fill the ship's tanks with oil from white whales. Although some whalers attempted to catch these smaller whales with nets, the most successful means of capture was to drive them into shallow water at high tide. The whales were kept here by rifle fire and the noise made by banging pans. When the tide receded the whales were left stranded on the flats and were then killed with bullets or lances. In 1928 a single drive yielded 300 whales from which 160 barrels of oil were extracted. However, the highest total for a single drive was 700.

Even though the price of whale oil dropped when substitutes (petroleum and kerosene) were found, the industry was kept alive by the high price of whalebone (baleen) which reached its peak of $10,000 per ton at the

turn of the century. In many cases, therefore, the capture of a single Greenland whale would pay for a year's operation costs and provide some profit as well. However, hunting was carried out with such fervor that by the 1880's the bowhead whales were nearing extinction. With the increasing scarcity of whales, hunting became unprofitable and many ships returned home empty at the end of the year. As a result only the Kekerten and Blacklead Island stations were kept open and the practice of ships over-wintering at other temporary bases was discontinued. When synthetic substitutes for whalebone were developed, around 1905, prices plummetted forcing the eventual closing of these whaling stations in Cumberland Sound.

Scientific Investigations - When the Howgate Expedition wintered at Annanactook in 1877, Ludwig Kumlien, a naturalist, carried out investigations on biological resources and ethnology. Five years later the German participants of the International Polar Expedition set up a station at Sirmilling Bay in Clearwater Fjord. This was one of a chain of stations established to carry out simultaneous observations on meteorology and terrestrial magnetism. A report of this expedition has been published by Abbes (1884). In the following year Franz Foas arrived to begin his study of the Eskimos. He lived and travelled with the natives for one year gathering information on migration, population, hunting techniques, customs and habits.

The Canadian government first sent an expedition into this area in 1897 under R. Bell and A.P. Low and a survey on whaling, fishing and hydrography was carried out. Twelve years later mapping of the interior and a study of mammals was undertaken by Bernhard Hantzsch who crossed Baffin Island to Foxe Basin.

Scientific activities ceased during the war years but were resumed again in 1923 when Major T. Burwash investigated the living conditions and biological resources of the Eskimos. Biological studies were continued by Soper (1925) who was employed by the National Museum of Canada to make an intensive study of the natural history of the whole area. In 1928 L.J. Weeks of the Geological Survey of Canada carried out geological investigations in the northern end of the sound and later these investigations were extended to the whole sound by G.C. Riley (1956, 1960). Oceanographic studies were conducted by M.J. Dunbar (1951), by the Fisheries Research Board (1953) and observations on the shore fauna were published by D.V. Ellis (1955). In 1953 an expedition into the interior was sponsored by the Arctic Institute of North America and investigations were centred around the Penny Ice Cap and Pangnirtung Pass. Studies undertaken by this team of scientists included glacier physics, seismology, meteorology, geology, geomorphology, zoology, botany and surveying.

Missionary Work - The first missionary visited Cumberland Sound in 1857. Warmow, a Moravian, accompanied Captain Penny and spent one winter looking into the possibilities of founding a mission in the sound. His report of "formidable difficulties" discouraged such an undertaking and the attempt was abandoned. In 1894, Mr. Crawford Noble, one of the whaling station owners, offered to take a missionary to Blacklead Island and provide a building to be used as the mission's headquarters. The Anglican Church seized the opportunity and sent the Rev. E.J. Peck to establish the ministry in the sound. Reverend Peck began Christianizing the Eskimos and taught them syllabics which remain the written language to this day. In 1901 Rev. E.W.T. Greenshield arrived at the mission and later extended the ministry to Padloping. The Blacklead Island mission was kept open after the closing of the whaling station but it too closed in 1926. The site was then changed to Pangnirtung where in 1928 the Anglican Church opened a hospital and re-established the mission.

Today the missionary is based at Pangnirtung and conducts two services in the native tongue every Sunday. His duties at the mission allow him to make only two visits to all the camps in the sound throughout the year and so the practice of training Eskimo catechists has developed. This allows the Eskimos to attend a service in their own camps every Sunday.

Trading Posts - In 1921 a post was opened by the Hudson's Bay Company at Pangnirtung and was one of fifteen fur stations established by the company in the following ten years. A small Hudson's Bay outpost was maintained at Kekerten and William Duval established one at the German Polar site (Sirmilling Bay). A few years later Duval also built a post at Livingstone Fjord. By 1929 two other posts were established, a sub-post of the Hudson's Bay Company at Blacklead Island and a Scottish trading post in Aktijartukan Fjord near Cape Mercy. The success of these outposts was short-lived, however, and Pangnirtung soon became the only trade outlet in the sound. It remained the only post until 1965 when Ross Peyton opened a private store in Pangnirtung.

Besides trading for furs, the Hudson's Bay Company also operated a whaling station with varying success between 1925 and 1962. The annual drive for white whales usually took place in July in Clearwater Fjord. During the drive all available natives were employed; the oil was rendered at the blubber plant in Pangnirtung and the work gave employment to Eskimo men and women over a period of a few weeks every summer.

R.C.M.P. - In 1903 a cruiser was sent to patrol the waters of Hudson Bay and the eastern Arctic. The purpose of its mission was also to help establish permanent stations for the collection of customs and the enforcement of law.

It was not until 1923 that a permanent post was established in Cumberland Sound. Inspector C.E. Wilcox supervised the erection of the R.C.M.P. station in Pangnirtung. He travelled extensively throughout the sound the next winter carrying out errands of mercy in times of food shortage. In the next few years the R.C.M.P. extended its patrols

into the interior visiting all the Eskimo camps in the sound as well as Padloping and Kivitoo on the east coast. A census was carried out on each trip.

The post still remains today at Pangnirtung and one of the three R.C.M.P. representatives is an Eskimo.

Department of Northern Affairs and National Resources - In 1962 the first Northern Service Officer (the title was later changed to Area Administrator) was sent into Pangnirtung. He took over the responsibilities of the distribution of family allowances, old age pensions and aid for disabled persons which had been previously administered by the R.C.M.P. His duties also included the allocation of social assistance to those in need.

The Department of Northern Affairs and National Resources (D.N.A.) has concentrated upon improving the economy of the Eskimos and raising their standard of living. In the last few years the settlement of Pangnirtung has developed rapidly along these lines. A new school was added to the small existing one and the number of teachers rose from one to four. Today there are about 100 pupils attending school.

A housing program has already provided 20 Eskimo families with one room houses. In 1966 another such project was started and 38 more houses were to be ready by the summer of 1967; these new houses contain two and three bedrooms. An Eskimo can either rent or buy these houses. If rented, the monthly payment is determined by the income of the tenant.

A pilot project in Clearwater Fjord examined the feasibility of re-opening the white whale industry.

HISTORY - OTHER SITES

Clyde River did not expand until 1942 when a defense-related weather station was built. A similar station was installed at Delight Harbour on Padloping Island about the same time. Although both meteorological stations were taken over by the Department of Transport, the Padloping site was closed in favour of operations at Durban Island.

Strategic defense sites, sections of the Distant Early Warning Line, were built at several points during the mid-1950's. In August, 1954, construction was started at Cape Christian on a LORAN station, first named DOPE 2 and later called by its present name, the United States Coast Guard Loran Station, Cape Christian. In 1957 the station expanded its facilities with the construction of a 2,500 foot sand airstrip. This was lengthened in 1958 to 2,800 feet and by 1960 to its present 5,000 foot length. The Royal Canadian Mounted Police established a station at Cape Christian in 1954.

Additional defense sites were built in 1956-57. They were Fox Three, sometimes called Dewar Lake or Mid-Baffin, Fox Charlie or Ekalugad Fjord, Fox Four or Cape Hooper, Fox Delta or Kivitoo, Fox Five or Broughton Island, Fox Echo or Durban Island and Dye Main or Cape Dyer. In 1963,

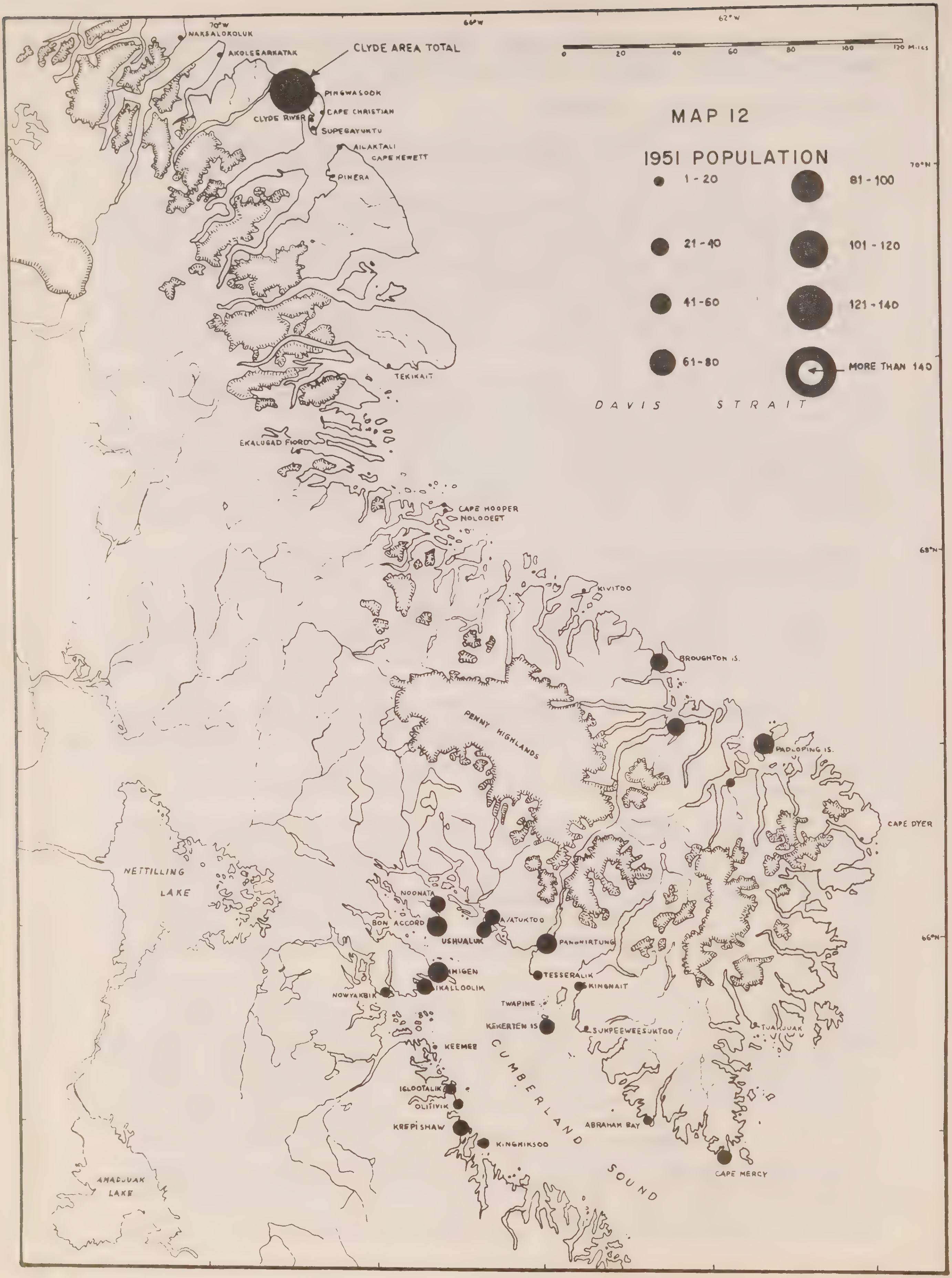
the intermediate sites at Ekalugad Fjord, Kivitoo and Durban Island were closed (Table 21).

POPULATION, 1850-1966 - GENERAL

No exact census counts are available for the Eskimo population of the survey region before the 20th century. Boas estimated that about 1840 the Cumberland Sound population numbered about 1,500 persons. In 1883 his census of persons in the same area suggested a drastic population decline which he attributed to the introduction of exotic diseases carried by the numerous whalers that visited the sound each summer. These figures and assumptions by Boas have, however, to be considered as highly questionable. In 1925 the total population of Cumberland Sound was estimated at 350 people living in 65 family units. By the summer of 1966, the population of the sound had increased to 594 (Tables 22, 23 and 24). Moreover, it can be seen that important population shifts have taken place between camps and settlements. The community at Blacklead Island declined from the 194 persons reported there in 1902 to 25 people in 1927, 12 persons in 1931 and none in 1944. In contrast the settlement at Pangnirtung increased from 54 people in 1931 to 340 in summer, 1966. The number of permanent camps around the sound decreased from a high of 16 in 1951 to eight in 1966. As recently as April, 1965, there were 12 occupied camps in the sound area. Population statistics for the east coast, from Padloping Island to Clyde River are incomplete before the mid 20th century. The original Eskimo residents at Clyde were brought there by the Hudson's Bay Company in 1923. Clyde's population was 32 persons in 1931. People now resident at Padloping all appear to have migrated to the east coast from the Cumberland Sound region. The Broughton Island and Kivitoo population is made up of families who, in the vast majority, trace their origin to Cumberland Sound or, in few cases, to Clyde River and other parts of Baffin Island. Total population figures for the east coast are shown in Tables 23 and 24. Similar to population changes in the Cumberland Sound region, the east coast shows a net increase of 49.6 per cent from 1951 to 1966.

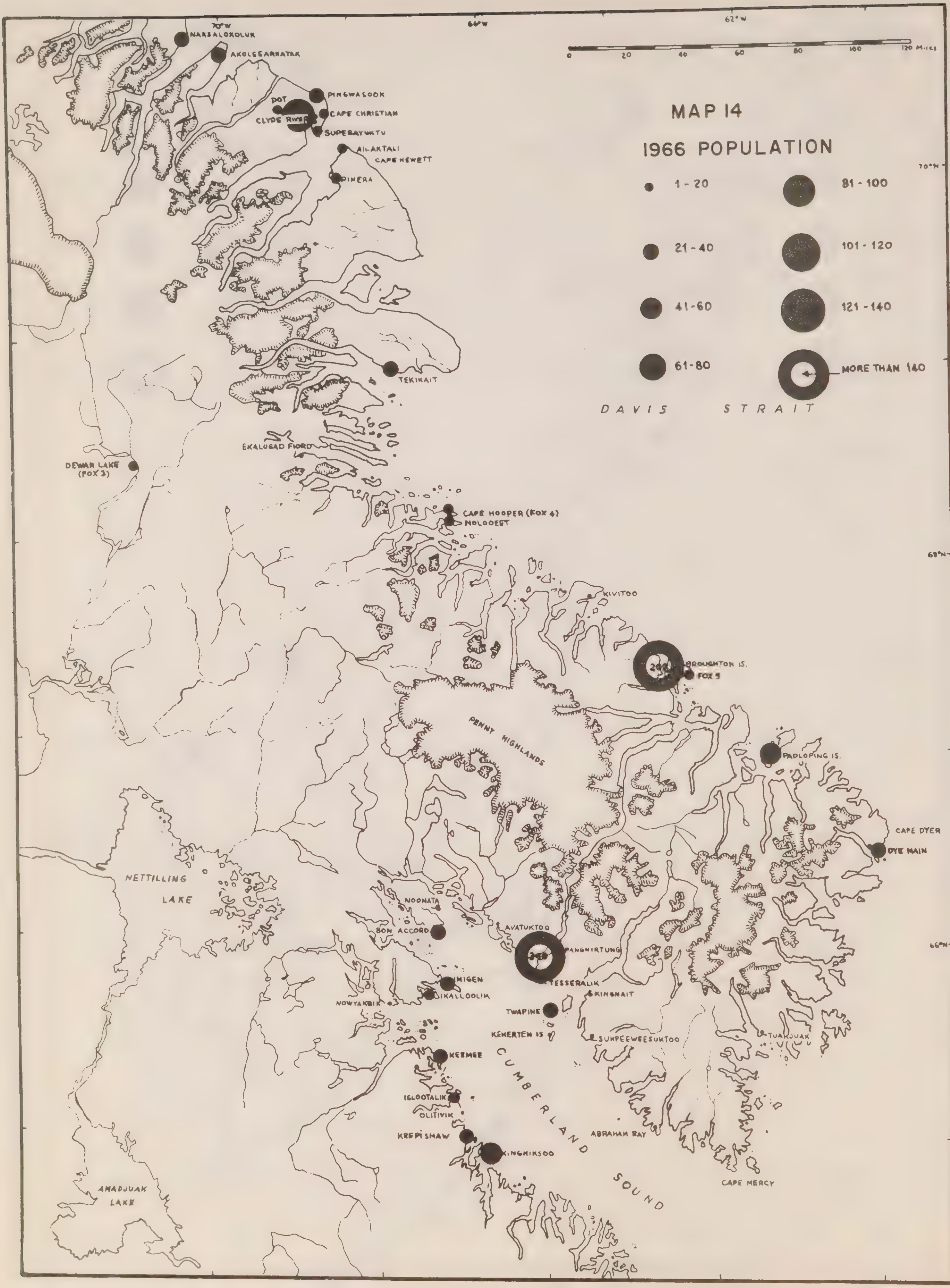
It can be seen from Maps 12, 13 and 14 that the Eskimo population distribution of the east coast, as well as Cumberland Sound, reached its maximum during the period 1956 to 1963, when all DEW Line sites were in operation. The trend since 1963 has been for a relatively rapid inward migration to Pangnirtung, Broughton Island and Clyde River. The distribution of the Eskimo population in summer, 1966, is given in Tables 25, 26 and 27.

In addition to changes in the overall numbers of people and their spatial distribution, there have been important shifts in the structure of the population. For example, in 1883 Boas calculated that there were 70 per cent adults and 30 per cent children in the Cumberland Sound population. In 1966, however, the same area showed 50 per cent of the population were less than 15 years old. Similar age groups made up 51.6 per cent of the Broughton Island population, 50.0 per cent of people at Padloping Island and 51.0 per cent of residents in the Clyde River area. A detailed breakdown of the population is given in Table 28 and Figures 8, 9, 10 and 11.



70°W
66°W
62°W
NARSALOKOLUK
AKOLEGARKATAK
CLYDE AREA TOTAL
PINGWASOOK
CAPE CHRISTIAN
CLYDE RIVER
SUPEGAYUKTU
AILAKTALI
CAPE HEWETT
PINERA
0 20 40 60 80 100 120 MILES
MAP 12
1951 POPULATION
1 - 20
21 - 40
41 - 60
61 - 80
81 - 100
101 - 120
121 - 140
MORE THAN 140
70°N
DAVIS STRAIT
TEKIKAIT
EKALUGAD FIORD
CAPE HOOPER
NOLOOEET
68°N
KIVITOO
BROUGHTON IS.
PENNY HIGHLANDS
PADLOPING IS.
CAPE DYER
NETTILLING LAKE
NOONATA
BON ACCORD
USHUALUK
PANGNIRTUNG
66°N
IMIGEN
IKALLOOLIK
NOWYAKBIK
TESSERALIK
KINGNAIT
TWAPINE
KEKERTEN IS
TUAKJUAK
KEEMEE
CUMBERLAND SOUND
IGLOOTALIK
OLITIVIK
KREPISHAW
ABRAHAM BAY
CAPE MERCY
AMADJUAK LAKE

70°W
66°W
62°W
0
20
40
60
80
100
120 Miles
MAP 13
1961 POPULATION
1 - 20
21 - 40
41 - 60
61 - 80
81 - 100
101 - 120
121 - 140
MORE THAN 140
DAVIS STRAIT
NAKSALOKOLUK
AKOLEEARKATAK
PINGWASOOK
CAPE CHRISTIAN
CLYDE RIVER
SUPEGAYUKTU
AILAKTALI
CAPE HEWETT
PINERA
TEKIKAIT
EKALUGAD FIORD
(FOX C)
DEWAR LAKE
(FOX 3)
CAPE HOOPER (FOX 4)
NOLOOEET
KIVITOO (FOX D)
BROUGHTON IS.
(FOX 5)
PENNY HIGHLANDS
DURBAN IS. (FOX E)
PADLOPING IS.
CAPE DYER
DYE MAIN
NETTILLING
LAKE
NOONATA
BON ACCORD
AJATUKTOO
PANGNIRTUNG
TESSERALIK
KINGNAIT
HIGEN
IKALLOOLIK
NOWYAKBIK
TWAPINE
KEKERTEN IS
SUKPEEWEESUKTOO
TJAKJUAK
KEEMEE
IGLOOTALIK
OLIJIVIK
KREPISHAW
KINGMIKSOO
CUMBERLAND SOUND
ABRAHAM BAY
CAPE MERCY
AMADJUAK
LAKE


MAP 14
1966 POPULATION
1 - 20
21 - 40
41-60
61-80
81 - 100
101 - 120
121 - 140
MORE THAN 140
0 20 40 60 80 100 120 Miles
70°W
66°W
62°W
70°N
68°N
66°N
DAVIS STRAIT
NARSALOKOLUK
AKOLEEARKATAK
PINGWASOOK
DOT
CLYDE RIVER
CAPE CHRISTIAN
SUPERAYUKTU
AILAKTALI
CAPE HEWETT
PINERA
TEKIKAIT
EKALUGAD FIORD
DEWAR LAKE (FOX 3)
CAPE HOOPER (FOX 4)
NOLOOEET
KIVITOO
BROUGHTON IS.
FOX 5
PENNY HIGHLANDS
PADLOPING IS.
CAPE DYER
DYE MAIN
NETTILLING LAKE
NOONATA
BON ACCORD
AVATUKTOO
PANGNIRTUNG
IKALLOOLIK
NOWYAKBIK
YESSERALIK
KINGNAIT
TWAPINE
KEKERTEN IS
SUKPEEWEESUKTOO
TUAKJUAK
KEEMEE
IGLOOTALIK
OLITIVIK
KREPISHAW
KINGMIKSOO
CUMBERLAND SOUND
ABRAHAM BAY
CAPE MERCY
AMADJUAK LAKE

DEVELOPMENT OF TRADE, CUMBERLAND SOUND

The acquisition of the rifle initiated the direct dependence of the Eskimo upon the white man. Since the former needed ammunition, a bartering system was consolidated. Trading first started with the whalers who needed skins for clothing. The Eskimo men provided caribou skins and the women tailored them into pants and parkas. These clothes made it possible for the whalers to cope with the cold climate when over-wintering. Services rendered by the Eskimos were paid for in rifles, ammunition, tobacco and molasses. Wood was also a desirable commodity and Kumlien states that in his day all the Eskimos' komatiks (sledges) were made from wooden materials that were either salvaged from wrecks or bartered from the whalemen. Eskimos who had worked for the whalers were repaid with whale boats and as a result an umiak (large skin boat) was a rare possession by the late 1870's. Metal knives and tools were also welcomed by the natives.

To the Eskimos these commodities soon became necessities rather than luxuries and bartering developed on an even larger scale. By the 1880's a substantial trade existed. Table 15 shows that in some years the sealskin trade rivalled the trade in the late 1950's and early 1960's (Table 16).

With the establishment of the Hudson's Bay Company at Pangnirtung in 1921, the Eskimos were encouraged to continue trading. However, by this time the sealskin was superseded in importance by the fox skin since it was in great demand in the western world. By the 1925-26 season thousands of fox skins were traded from Eskimos in the Cumberland Sound region.

The trade was extended to include not only necessities but many new luxury items. After World War II bartering developed into a cash exchange and the Eskimo was given money for his skins.

MIGRATION PATTERNS, CUMBERLAND SOUND

The whaling stations established in Cumberland Sound attracted the Eskimos and thus concentrated the population in two major locations, Blacklead Island and Kekerten, for most of the year. Toward the end of the nineteenth century most of the whaling was carried out by the natives and the stations were managed only by two or three white men.

A seasonal migration existed at this time. The Eskimos would leave the stations for the interior to hunt caribou as soon as the ice left the sound. Returning in September, they would then work at the whaling stations until freeze-up and go back to sealing in the winter. The main purpose of the journey inland was to secure sufficient skins for winter clothing. With the decline of the caribou there was a change to manufactured clothing and wool and the migrations inland ceased. At present the parkas (kolitauyaks) are made from duffel and grenfell cloth and only in extremely cold temperatures is an outer caribou parka worn.

Another important reason why the Eskimos ceased their migration is the recent increased value of the sealskin. If an Eskimo goes into the interior, he cuts himself off from the seal hunt and therefore limits his earning power. Caribou hides are not generally bought at the Hudson's Bay Company store and although the hunter may be able to feed his family with the meat of the caribou, without seakskins he cannot buy ammunition, fuel, flour and tea which are now necessities. Therefore, the majority of the Eskimos spend most of their time seal hunting.

The caribou is generally hunted in summer under two conditions. These are: 1) if the caribou are in the vicinity of the seal hunting area, 2) if an Eskimo desires a change in diet. In winter, however, only a short trip into the interior is undertaken with the specific purpose of hunting caribou.

CHANGES IN CUSTOMS:

The introduction of money into the hunting economy has ended another tradition. At the beginning of the century, the leader of the camp, who was usually the oldest Eskimo with the most experience, would obtain the necessary provisions by trading the skins that he had collected from the hunters in his camp. He would then return to distribute the goods to his people.

With the introduction of cash, the money did not go into a community pool but was collected by the individual hunter. This meant that a more conscientious hunter could buy better hunting equipment, such as a canoe or outboard motor, and more luxury commodities such as a radio or record player. Thus the number of possessions now varies greatly between hunters in the same camp.

As it is today, the skin of either the ringed or harp seal belongs to the person who kills it. The common sharing of food has not changed, however, and if the skin is not to be sold as in the case of most bearded seals, it may also be shared.

POPULATION DYNAMICS, CUMBERLAND SOUND

Since the whaling stations provided seasonal employment, the Eskimos who were previously scattered throughout the sound congregated at these places. In the 1840's Kekerten may have had 400 natives living near the station. This put the Eskimos in a vulnerable position, for if bad ice conditions prevailed in the area their existence was threatened by severe food shortages. Many times the whaling agent had to ration food to keep the people from starvation.

When a whaling station closed down, the Eskimos would move to another in the hope that they would be hired. When the whaling station at New Gummiute was abandoned, 120 men, women and children appeared at Blacklead Island seeking work.

With the collapse of the whaling industry, the people once again split up into smaller groups. However, because of the lack of opportunity for

employment and the physical factors of extensive tidal flats, distance from hunting areas and föhn winds, large numbers of people were unwilling to settle around the Hudson's Bay Company post in Pangnirtung. Consequently the population remained dispersed until the beginning of the 1960's. The arrival of D.N.A. changed the situation. Employment was now available for a few Eskimos and the distribution of social assistance and the provision of houses for the Eskimos helped to draw the people in from the camps. Increased social activities in the form of dances, movies and games also provided incentive for movement into Pangnirtung. When there were hardships in a camp the people would move into Pangnirtung instead of trying to find another suitable area. One by one the number of camps in the sound decreased; the inhabitants of Nunata moved into Pangnirtung in 1965 and on May 23, 1966 the people from Abraham Bay, Toakjuak, Avatuktoo and Nowyakbik arrived. These moves seem to be permanent ones.

At present only eight permanent camps remain outside Pangnirtung. Tables 29 and 30 give a breakdown of the population and a selected list of population data over the last 120 years.

AN ANALYSIS OF SEASONAL SEAL HUNTING PATTERNS IN CUMBERLAND SOUND

METHODOLOGY

Much of the quantitative data pertaining to seal hunting was gathered from questionnaires and interviews. In order to properly interpret these data, it was necessary for Mr. Haller to participate in as many hunts as possible. In this way, too, it was possible to collect information not generally known by the Eskimos. For example, the number of shots fired per seal killed, found in Table 31 and the percentage of low and high calibre bullets used, were determined from these trips. During the field period Mr. Haller went on 12 hunts which lasted for a total of 32 days. Some 1,450 miles were covered on these trips in which the means of travel were ski-doo, dog team, rowboat, canoe and whale boat.

Although data from 121 hunts were collected, the tables in this chapter only include the hunts in which complete information has been recorded. This explains why only 100 hunts are used in Table 32.

Data gathered from these hunts showed significant variations in the mileage and duration of trips in the spring, break-up, and summer seasons. In order to calculate the distance travelled, Eskimos were questioned as to where their hunting trips had taken them. Invariably the replies given referred to the farthest points they had reached. It was necessary, therefore, to become familiar with as many Eskimo place names as possible. The distances were then measured in miles with an odometer on a 1:500,000 scale map taking the most probable direct routes. That is to say, the distances measured are those in which the time of year, ice conditions, weather and traditional travel routes were taken into consideration and wherever possible Mr. Haller tried to simulate the most likely route through the offshore islands. A weakness in using this method is that the hunters may have deviated from the expected route for unknown reasons and may have hunted in areas which were not taken into consideration. Thus the actual mileage would be more than that used in the calculation. On the other hand, for reasons such as bad weather or the sudden blocking of an area with broken ice, the hunting route may be cut short. These errors, therefore, may nullify each other.

It should be pointed out that the distance measured will not be the actual distance travelled because the hunters invariably zig-zag when pursuing a seal. However, in many cases the hunter has a destination in mind and proceeds to it returning later to the place of origin if that point is either a permanent or temporary base.

This analysis deals exclusively with the seasonal patterns of ringed and harp seal hunting. This is done not only because of the seal's domination, in terms of the local hunting economy but also because of the effect on the settlement pattern of the area. The location of camp populations and the movements of the hunters are basically related to the dynamics of the seal hunt. It will be shown how physical,

biological and certain cultural factors are combined at different seasons and in different locations to create varying measures of efficiency in hunting, both in numbers of landed seals and in net profit to the hunters.

The hunting seasons under discussion here are defined as follows:

Spring: This period begins when ringed seals are first hunted on the ice and ends with break-up. During 1966, data related to this season were collected between May 21st and June 11th.

Break-up: This period spans the time in which the fast ice first begins to break up until the ice has left the sound. In 1966, the starting and ending dates of this season were June 12th and July 11th respectively.

Open-Water: This is the season when most of the sound is ice free. Observations on this season lasted from July 12th to September 1st.

Winter: This period lasts from freeze-up to spring. No field observations were made during this season.

CONTINUOUS ICE - SPRING

In May ice conditions are ideal and except for areas around the rip tides and tidal flats travel is carried out without much trouble. As most of the camps are quite a distance from the floe edge most of the hunting activity is concentrated on the fast ice.

Equipment: Just as the ice conditions change with the seasons so do the methods of travelling and hunting. In the spring, the natives travel by komatik and dog team or ski-doo. On a regular hunt the average number of dogs used is ten. However, if a heavy load has to be pulled over a long distance, a team may have as many as 20 dogs. In the last three years ski-doos have increased in number and in August, 1966, about one in every three families owned one (Table 33).

Because of the difficulty of travelling in deep snow, the Eskimos follow paths that have been previously used. These tracks are followed until the person wishes to branch off in another direction (Figure 12). Such paths or ice-roads facilitate travel since the snow is well packed allowing the runners of the komatik to glide smoothly. If the sledge veers off the road, the runners dig into the snow and put a heavier burden on the dogs or ski-doo. In places where there is no path, deep snow may prohibit passage unless the driver proceeds with only the ski-doo in order to pack down the snow and then returns to pick up the sledge.

On days when the sun's rays are warm enough to melt the surface layer of the snow, travel becomes sluggish as the wet snow sticks to the runners. When this happens the hunters will usually travel in the evenings for, towards the end of the day, the wet snow refreezes forming a crust which makes for good travelling.

During spring, many of the natives who own dogs hunt alone. However, if a ski-doo is used, it is usual for two men to hunt together as it is extremely difficult to manage a ski-doo when travelling through rough ice. One man is needed to drive the ski-doo while the other keeps the runners of the komatik from getting stuck.

Passage through rough ice by ski-doo is also difficult because of the sled-ski-doo hitch. This single rope hitch is a disadvantage since the pulling power is directed through only one line of force, and, when the rope becomes stuck in the ice, forward movement is prevented. This differs from the fan-hitch of the dog team where the pulling force is spread out in different lines. Although one line may become temporarily stuck, the other lines are still functioning.

Another important item of equipment is an ice-tester which is often an ice chisel. This tool is used to judge the thickness of the ice. At times, seals are hunted in areas of thin ice and, by chipping the ice with the ice-tester, a skilled Eskimo can tell the thickness and strength of the ice from the sound produced.

The Spring Hunt: Beginning in April, the feeding activity of the ringed seals decreases and the seals begin to haul out on the ice in order to bask in the warm sun. Therefore, the method of hunting is to approach as close as possible to the basking seal and shoot it.

On a sunny day, a basking seal can be seen for a distance of about one mile on level ice. Upon sighting the seal the hunter heads towards it, stopping his komatik about 500 yards away. Here he begins the stalking on foot as the noise of the ski-doo or the howling of the dogs would alarm the seal. In addition to his rifle the hunter also carries a white canvas shield about 40 inches high and 30 inches wide. This serves to camouflage him against the snow and ice. As the seal has poor eyesight in air, the hunter does not crouch fully behind his shield until he is about 150 yards away from his target. For the next 50 yards he advances with caution, stopping and hiding behind his shield if the seal lifts its head. When he is within 100 yards he will pick a position which will enable him to get a shot at the seal's head. The head is aimed at for two reasons. A bullet hole anywhere else in the sealskin will lower its value, and because this shot is usually not a killing shot, the seal can get back into the water and escape. In general, most killings are made at from 70 to 100 yards of the seal although in one case a sleeping seal was approached within 35 yards before it was shot. The average stalk, from the time the hunter first starts walking to the time he fires the bullet, lasted nine minutes. Not every stalk, however, is successful for occasionally a seal is frightened into its hole before a shot is fired.

As the hunter rests his rifle on the shield and fires at a stationary target, the probability of killing it is very high. A sample of spring hunts in Cumberland Sound showed that during this season an Eskimo kills eight of ten seals he fires at (Table 31). Usually only one shot is fired for if the seal is missed, it dives into its hole before a second shot can be fired. Taking into account shots missed,

as well as seals hit but not killed, it was found that an average of 1.5 shots were fired for each seal killed

In the spring season, the time and mileage spent on each trip is greater than in either of the two following seasons (Table 32). Ideal ice conditions allow the hunters to travel long distances and in this period the inhabitants of Pangnirtung hunt as far as the floe edge.

Studies made during the spring of 1966 showed that the average hunt lasted for a period of 6.6 days, and in this time an average of 199 miles were covered*. Between May 21st and June 11th, the average yield was 0.5 of a seal per man per day and an average of 42.7 miles were travelled before a ringed seal was landed. This high mileage figure can be attributed to the fact that not all the ringed seals are basking on the ice at this time and to the fact that the seal population in the fast ice areas contains only the adults, as the immature seals are still at the floe edge. Most of the data in this season represents hunting trips made around Pangnirtung. It is, therefore, possible that by this late date (May 21st) the low yield of 0.5 seals per man per day may be caused by heavy hunting of the resident adult ringed seal population.

BREAK-UP

At the end of May, small patches of open water, called awkunga, appear in the ice. Cracks develop into lanes and with the help of tidal movement many areas of open water are found along the shore. Next, the central ice is broken into large floes which then move under the influence of winds and tides. Icebergs aid in the further breaking of ice.

Equipment: During this season, the rowboat, or canoe, and outboard motor are added to the hunting equipment. In 1966, boats were first used in the Pangnirtung area on May 21st. With numerous areas of open water, it becomes necessary to ferry the dogs or ski-doos. As ice conditions worsen and the amount of open water increases, the boat and motor will be used more than the komatik. Yet as long as large amounts of ice are found in the sound the hunter will continue to carry his komatik which is usually straddled across the boat. Thus if winds should jam an area with ice he can always transport his boat on top of his komatik. In an instance witnessed in summer 1966, the boat and sledge had to be pulled across three miles of ice without dogs. Without the komatik, the task would have been very difficult. Therefore, the Eskimos always watch the movement of the ice for in a matter of minutes a lane that is a few hundred yards wide may be completely sealed, necessitating the arduous task of hauling the boat to another area of open water.

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* The shortest and longest hunts recorded during this period were 2 and 14 days respectively. The shortest and longest distances were 45 and 330 miles respectively.

<u>The Break-up Hunt</u>: With the occurrence of areas of open water hunting takes on a new form. The hunters will travel along these areas and a party may stay at one such awkunga for up to two days provided ice movement does not close it up. The hunters spread themselves about 100 yards apart and wait for the seals to appear. When the seal is shot, the boat is then launched and the seal retrieved.

In this season, some of the ringed seals will sink when shot and are thus lost to the hunters. Harp seals have arrived in Cumberland Sound by this time but they too usually sink upon being killed. Therefore, if the hunter has enough time, he aims for the seal's nose or throat. By doing this, he does not kill the seal outright; when the harp seal surfaces the next time, it is weak from loss of blood and does not usually dive right away. This allows the hunter to get close to it by boat and shoot it fatally. Since he is near the seal, he may be able to hook it with a netsick or gaff before it sinks.

At the beginning of the break-up season, the number of open water areas are few and the chance of the seal re-surfacing in the same awkunga is great. Many of these areas are less than 30 feet long and 10 feet wide but later in the season, they are greatly enlarged and the seal may surface out of range. In order to draw the seal closer to the ice edge, the hunters will often scratch the ice with a piece of wood to simulate a seal or beat on a gas drum to lure the seal in for a better shot. But after the shot is fired and the seal is missed, the animal will generally flee from the ice edge. Observations on shots fired and hits show that there is a higher percentage of hits during the first part of the break-up season when the shooting is at a closer range (Table 31).

Hunting with the shield is still carried on during this period, but, by the end of the break-up season, rotten ice is widespread and may prevent the hunter from stalking. In addition, travel is mostly by boat and not by dogs or ski-doo, and the men will not walk very far even though basking seals are not at an extreme distance from open leads.

Travelling distances are shorter in this season. Because of the imminent danger of a sudden storm breaking up the ice hunting trips are confined to the vicinity of the camps. The average length of a trip between June 12th and July 11th was 103 miles and lasted 3.6 days*. During this season there are days when hunting can be carried out for 24 hours because of the long period of daylight. The change from komatik travel to boat and the ferrying of dogs or ski-doos, however, takes time and effort and therefore the average daily distance travelled was only 29 miles. From data collected it was calculated that the average number of ringed seals landed per man per day was 1.3 and the miles travelled per ringed seal landed was 14.4. This increase in yield above the spring value can be explained by the movement of the immature seals into the fast ice via the awkungas and leads. With this inward movement there is an increase in the density of seals for now both the adults and the immatures are found in the fast ice.

*The shortest and longest hunts recorded during the break-up period were 2 and 6 days respectively. The shortest recorded distance was 26 miles and the longest was 240 miles.

OPEN WATER:

By mid-July the ice is completely broken up and the sound can be cleared of ice in two or three days if a strong northwest wind prevails.

Equipment - During the season of open water boats are the means of travel. The majority of these are 14 to 16 feet long and are powered by outboard motors (usually three or six horse power). Because of the danger of being caught in a storm in the middle of Cumberland Sound in such small craft, the Eskimos do not venture far from shore. For journeys across the sound, whaleboats powered by a gasoline engine are used.

In late summer nearly all of the sound is ice-free and one can travel to most areas. However, the main hindrance to travel during this period is not ice but waves and currents. Waves caused by katabatic winds in the east coast fjords make small craft navigation difficult. Often it is impossible to hunt in these waters. When storms come in from Davis Strait it is not uncommon to find waves seven feet high in the sound. Furthermore, tidal currents place additional restrictions on boat travel.

The Open-Water Hunt - The method of hunting in this season is to cruise along the coastal waters looking for seals. Usually two hunters occupy each rowboat. As the ringed seal commonly swims with only its head out of the water it can be seen at a maximum distance of about one third of a mile with the naked eye. Spotting a seal at this range is possible only under ideal conditions of calm water and pearly overcast; this distance decreases with an increase in cloudiness and wave height.

When a ringed seal is sighted the hunter shoots at it as soon as possible because hunted seals generally dive within ten seconds of surfacing (Table 34). Even if there is little chance of hitting the seal, the shot is still fired in order to force the seal to dive without breathing properly. This in turn makes it surface again sooner than it normally would. After the seal has dived, the boat is positioned at the spot where the hunter judges the seal will surface. Here he usually turns off the motor to allow him and his partner a more accurate shot. However, should the hunter misjudge the place where the seal surfaces, it may re-surface out of spotting range. The harp seal is hunted in a slightly different manner. When alerted, it has a tendency to come further out of the water than the ringed seal and, being a large animal, it can be seen at a greater distance. Little effort, however, is made to hunt the harp seals if they are far from the boat. These seals dive for a longer time than ringed seals and they usually surface out of range after being shot at. It is also very difficult to judge the direction of the harp seal's dive. In addition, during the early part of the summer, a very high percentage of harp seals sink within a few seconds of being shot (many sink within one second). 'Sinking' ringed seals will generally float for a longer period than a harp seal. One ringed seal was observed to float for nine seconds before sinking.

With faster motors, therefore, there is a greater chance of retrieving a sinking seal. Because of this sinking, only harp seals which surface close to the boat (less than 100 yards) are hunted in this season. Later in the summer, however, when the seals begin to float after being shot, the hunters chase them and most kills are made from a moving boat. Harp seals generally stay at the surface for a longer time than ringed seals and often are stationary when breathing. This, along with the fact that only nearby seals are shot at, accounts for the fewer number of shots fired per harp seal killed as compared to ringed seals during the open water season.

Between July 13th and September 1st, hunting trips averaged 133 miles and lasted 2.7 days*. The low average for the duration of the hunting trip is due to the fact that many of the hunts during the late summer lasted for only one day. These were hunts which originated from summer camps. Miles travelled per day, however, were at a maximum during this season for there was little or no ice to impede boat travel.

During this period, the yield per miles travelled decreased as one seal was landed every 24.3 miles. This was ten miles more than that travelled for each seal landed during break-up. The yield per man per day also decreased from 1.3 during break-up to 1.0 during the open water season. Two factors can account for this reduction in yield. It could mean that the ringed seal density is smaller during open water and the ringed seal migration discussed previously would explain this diminution. Furthermore, from Table 11 it is shown that when hunting from boats only 36.7% of the seals shot at are killed, whereas when hunting from the ice, which is the principal method during break-up, 56.7% of the seals shot at are killed.

<u>Constraints</u> -- During the period of open water there are a number of constraints that limit the range at which a seal may be spotted. In conditions of calm and pearly overcast, the seal's head, being darker in colour, stands out against the background of light water and the slightest disturbance of the water surface is easily detected by the hunter. When waves are present, however, the light background disappears and any ripples created by the seal are lost. Furthermore, depending on the wave height, the seal's head is not always visible as it is periodically in the trough of the wave. Thus, with waves higher than six inches spotting is limited to 200 yards. Waves also contribute to the inaccuracy of shooting by causing a bobbing motion of the boat.

Because of this effect of wind, the nature of the coastline is of great importance. Off a simple coastline, with few islands and inlets, hunting conditions deteriorate with an increase in wind speed and the hunt is usually terminated when winds exceed 20 m.p.h. However, because the coastline surrounding Cumberland Sound is very complex, especially the west coast, hunting is possible in winds of that

* During the open water period the lowest mileage recorded on a hunting trip was 25 miles and the longest was 690 miles. The shortest trip lasted five hours and the longest lasted eight days.

magnitude. The numerous islands and inlets create areas of sheltered waters and it is to these places that the hunters go in windy weather. Here the effects of the wind are modified and the wave height is considerably reduced. As the hunting areas are small and limited to the lee side, the direction of the wind becomes an important factor (Figure 14). Topography is also important for an island of low elevation affords little protection, (Figure 15). Thus, during periods of wind, hunting is confined to the inner waters and the practice is to move from one protected area to another.

Unfortunately, the presence of these islands is not entirely beneficial to hunting because of the shadows they create. Depending on the angle of the sun and the elevation of the islands, large areas of water may be shaded. These shadows creat a blackened area (takalina) on the surface in which it is extremely difficult to spot a seal's head. In most cases it is possible only with binoculars to pick out a seal in such an area and the spotting range of a boat may be considerably reduced (Figure 16). There is a case, however, where this adverse effect may be nullified by wind. It happens, occasionally, that a gust of wind causes slight ripples to invade the shaded area. Where this occurs, sunlight is reflected on the ripples producing a light background in which it is possible to spot a seal's head (Figure 17).

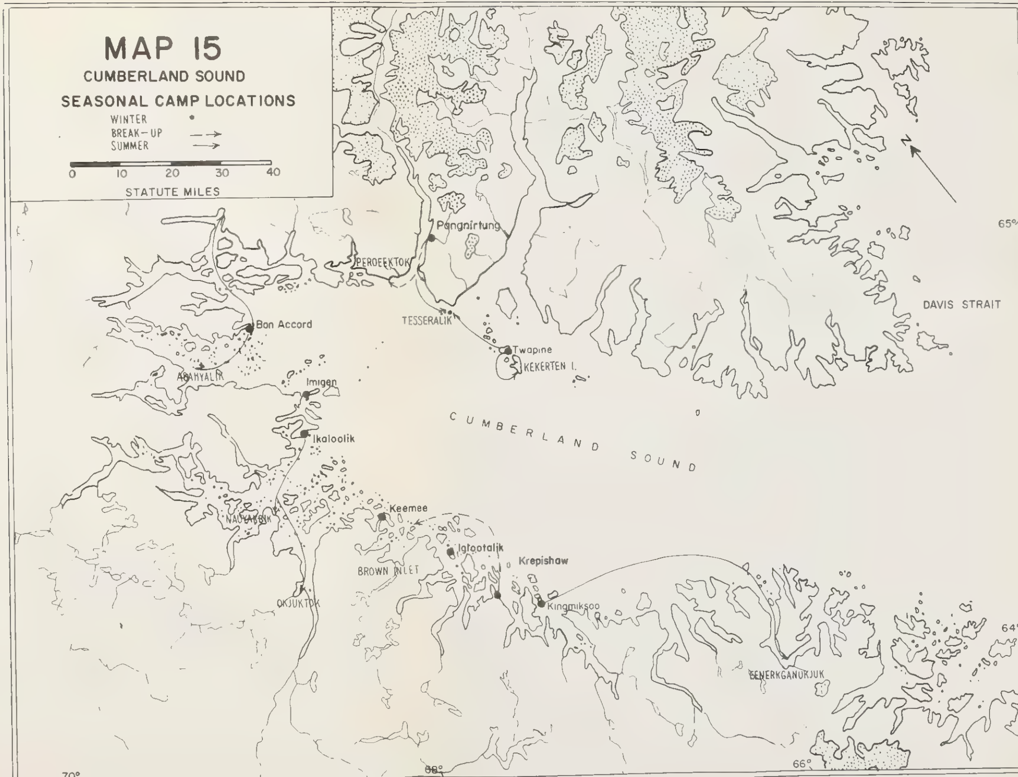
When the sun is below the horizon, or if a heavy overcast exists, the light is diffuse and the islands create shadows which fall toward the observer. At this time the shaded areas are greatly enlarged and the spotting range is diminished (Figure 18). At twilight the shadows cast by distant islands are lighter than those nearby and there remains a chance of sighting a seal against this lighter background (Figure 19).

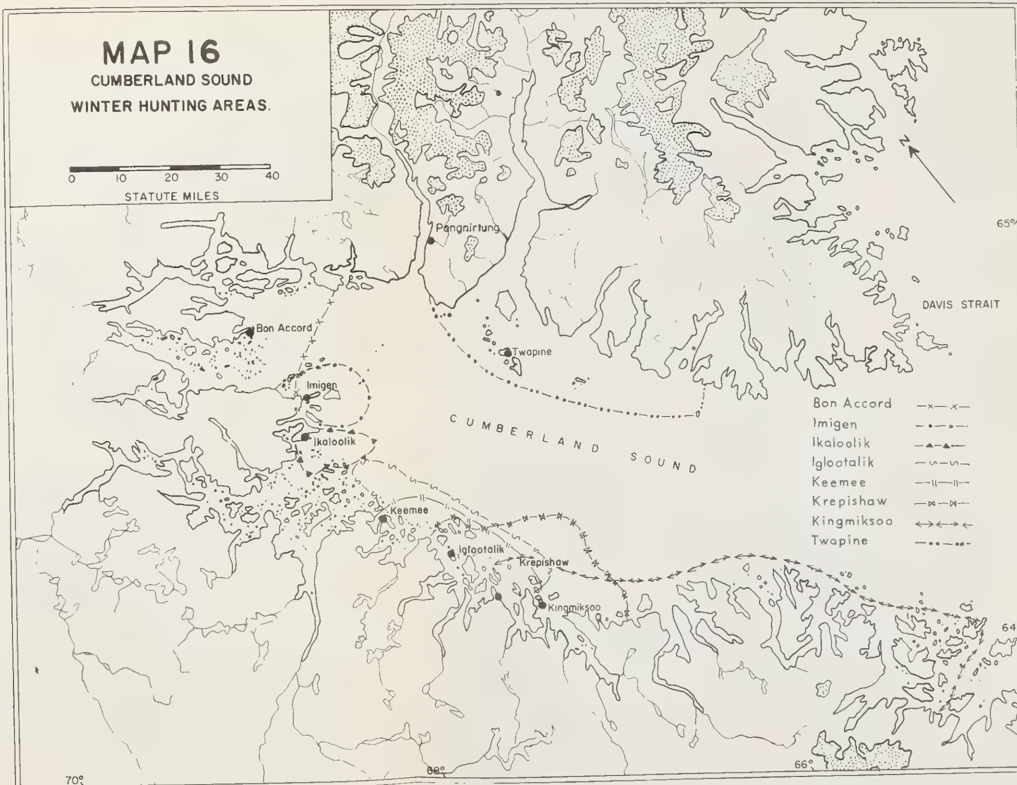
Lastly, another environmental constraint which reduces visibility is sun sparkle. When ripples are present on a very sunny day the light is reflected from the surface, creating a glare which restricts the vision of the hunter and reduces the spotting range.

CONTINUOUS ICE - WINTER

With arrival of freeze-up, travel is at a standstill for a period of about two weeks for the unsound slush ice moves with both the wind and currents. By the end of November, the Eskimos can travel on the fast ice and hunt along the floe edge. There is no hunting in the central part of the sound until mid-January when the ice is stabilized and only then do the Eskimos venture any distance from the fast ice. Seals are hunted at their breathing holes and at shabaks in this period. A few Eskimos in the camps net seals but this technique is not widely employed and a total of only six seals per man was the reported maximum during the 1965-66 winter period. Hunting trips in winter last longer than one week and the hunters build temporary igloos while they are on the hunt.

When hunting at breathing holes, the seal is fired at from point blank range so there is little chance of missing. It is not certain, however, if every bullet is a killing shot and some wounded seals may


MAP 15
CUMBERLAND SOUND
SEASONAL CAMP LOCATIONS
WINTER
BREAK-UP
SUMMER
0 10 20 30 40
STATUTE MILES
N
Pangnirtung
PEROEEKTOK
TESSERALIK
Twapine
KEKERTEN I.
Bon Accord
AAAHYALIK
Imigen
Ikaloolik
CUMBERLAND SOUND
DAVIS STRAIT
65°
Keemee
NAUYABBIK
Igtootalik
Krepishaw
BROWN INLET
OKJUKTOK
Kingmiksoo
EENERKGANUKJUK
64°
70°
68°
66°



MAP 16
CUMBERLAND SOUND
WINTER HUNTING AREAS.

escape. The number of shots fired per seal landed is therefore estimated to be just a little less than the number used during the spring hunt.

SEASONAL HUNTING AREAS AND CAMP LOCATIONS

The location of permanent or 'winter' camps in Cumberland Sound may be explained by the distribution of fast ice. As most of the ringed seal population is found in the fast ice and along the floe edge during the winter, the camps have been established in these areas of stable ice.

Another factor in locating a camp is the proximity to local tide rips or the floe edge where seals are abundant. Until January all the camps except Bon Accord and Pangnirtung are within ten miles of the floe edge. After this date, the stabilization of the central ice leaves only Twapine, Krepishaw, and Kingmiksoo within a day's travelling distance to the floe edge.

Beach site is considered in camp location, both in summer and winter. Where wide tidal flats exist, travel across the barrier ice at low tide is extremely difficult and such a site will usually not be chosen. In summer these flats can also limit the departure and landing of boats to periods at high tide.

Because of the effects of wind in summer, camp sites are located in areas where sheltered waters still permit hunting from boats. It is partly for this reason that there is a high concentration of camps among the islands off the west coast of the sound.

During break-up, ringed seals are abundant in certain areas and so some Eskimos move to 'break-up' camps. In 1966, there was a movement from Pangnirtung to Peroeektok, Otahkeeopbik, and Panowtalik and the people from Krepishaw and Keemee moved to Brown Inlet (Map 15).

The particular winter hunting areas for each camp are shown on Map 16. Tidal currents in the vicinity of Imigen and Ikaloolik account for the small number of square miles used by these camps (Table 35). The hunting area for Pangnirtung is not shown as many of the residents have formerly come from the outlying camps and will often hunt in the areas around the camp of their origin.

The boundaries of each camp are mainly determined by the knowledge of the ice conditions of the area. That is, unless a hunter is familiar with the ice characteristics he will usually not hunt in the region.

Where there is constant hunting around the permanent or 'winter' camps, the local ringed seal winter stock may be gradually depleted. With the movement of some ringed seals out of the sound in summer, the numbers of available seals are further reduced. Therefore, to increase the yield per unit effort the hunters may travel 50 or 60 miles to relatively unhunted areas, transporting their rowboats on top of their whaleboats, and hunt in these waters for four or five days before returning home.

Such trips were made by the hunters of Imigen, Keemee, Krepishaw, Twapine and Kingmiksoo.

An alternative step taken by some Eskimos to make summer hunting more productive is to move to a summer location where seals are abundant. From these 'summer' camps daily hunts are made with the hunters usually returning every night. Thus, the permanent or 'winter' camp areas are free of hunting for the summer period and this allows ringed seals to re-disperse back into these areas from surrounding regions thereby replenishing the 'winter' camp waters.

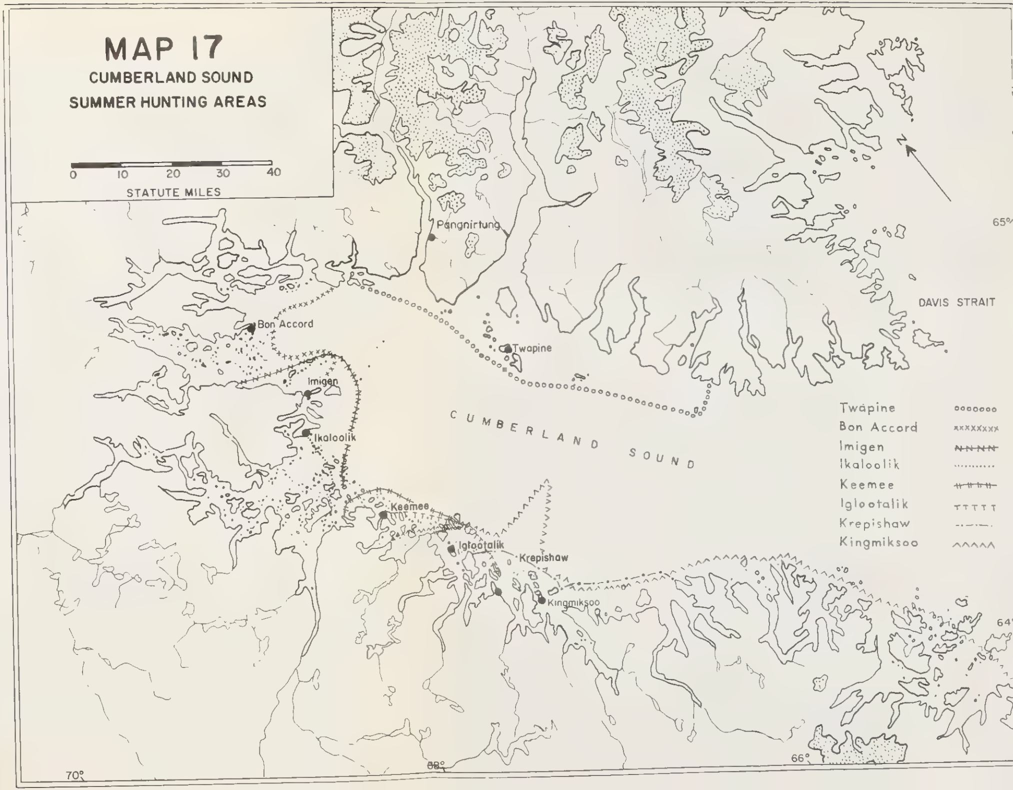
The summer hunting areas for each camp are found on Map 17. As seen, most of the areas are within a few miles of the coast. The extension of Kingmiksoo hunting area to the middle of the sound indicates that these people hunt around the loose ice when some of the ringed seals leave the sound.

SHOTS FIRED

In examining Table 31, it should be remembered that these figures represent the average number of shots fired per seal killed and variations from these norms occur with the use of different weapons, means of travel and weather conditions.

The number of shots will vary with the calibre of the rifle used. As the .22 calibre rifle is used mainly to force the seal to dive and is not necessarily aimed to kill the seal, the shots fired per seal will always be high when the hunter uses a .22 rifle. Even when a ringed seal is spotted in excess of 300 yards, a shot will be fired to force the seal to dive. On the other hand, a hunter using a .222 calibre rifle usually will not fire if the seal is beyond 150 yards; he is also more careful in aiming because the price of the bullet is about ten times the cost of a .22 bullet. Therefore, the number of shots fired per seal is fewer when using a .222 calibre. Many Eskimos take both rifles on a hunt and will switch rifles depending on the range.

On calm days, the number of shots fired per seal should be lower than on windy days. Waves produced by winds cause a bobbing motion of the boat and thereby lower the accuracy in shooting. The magnitude of the motion will depend on wave height and type and speed of the boat. As a whaleboat rides deeper in the water than a rowboat or canoe, there will be less oscillation in the whaleboat when both are not under power. However, when it is not too rough, a fast rowboat or canoe can ride the crests of the waves and shooting from these boats will be more accurate than from a moving whaleboat as the inboard engine of the whaleboat causes a jiggling motion of the boat.


MAP 17
CUMBERLAND SOUND
SUMMER HUNTING AREAS
0
10
20
30
40
STATUTE MILES
Pangnirtung
Bon Accord
Twapine
Imigen
Ikaloolik
Keemee
Iglootalik
Krepishaw
Kingmiksoo
CUMBERLAND SOUND
DAVIS STRAIT
N
65°
64°
70°
68°
66°
Twapine
Bon Accord
Imigen
Ikaloolik
Keemee
Iglootalik
Krepishaw
Kingmiksoo

COMPARISON OF RINGED SEAL CATCH

Studies concerning the ringed seal yield per unit effort have been carried out previously by McLaren and his empirical catch is compared with the actual catch in Cumberland Sound during the 1966 field season (Table 36). McLaren's theoretical catch is derived by multiplying a value of seals per man per day (determined from actual hunts) by an availability index. This availability index is obtained by dividing the theoretical ringed seal population of Cumberland Sound by the area of water within 10 miles from shore. Because the actual summer catch in 1966 is based on hunting from all types of boats, McLaren's theoretical catch values for small and large boat hunting have been averaged in order to give a single value for summer hunting.

Except for the catch of the break-up period, there are major differences in the compared values.

In attempting to explain the much lower value for the catch during the spring, it must be noted that McLaren's data refers to hunting trips that were carried out in ideal weather. The catch for 1966, however, takes into consideration all weather conditions. During cloudy and windy weather, few seals will be found on the ice.

Because most of the data concerning the spring hunt deals with hunting around the Pangnirtung area, where there is a high concentration of hunters, the low value may also be due to the over-exploitation of the seal stock. Furthermore, the hunting of basking seals had started in April and by the end of May, when the data were first collected, many of the resident adult ringed seals had been killed off and the stock was not yet replenished because the immature seals had not yet moved in from the floe edge.

Regarding the large difference in the catch values for the open water period, it can only be suggested that this is best explained through the ringed seal migration.

ECONOMICS OF HUNTING - CUMBERLAND SOUND

HUNTING EQUIPMENT -

The Eskimos of Cumberland Sound employ modern equipment to carry out seal hunting. A complete inventory of the hunting equipment of each camp was given in Table 33. Most of the rifles, canoes, rowboats and outboard motors were purchased in the last five years and are in generally good condition. High powered rifles, especially those chambered for flat trajectory calibres, are ideal for seal hunting and the .222 is preferred by most Eskimos. The majority of outboard motors are in a five to six housepower class although during the last year there was an increased demand for the $9\frac{1}{2}$ h.p. Only six of the eighty-five outboards in the sound are 18 h.p. or over. The newer model motors require only one quart of oil per ten gallons of gasoline which is half the amount needed for the older models.

The ski-doos used in the Cumberland Sound area are less than four years old. However, rough ice conditions add much stress to the machines and the life of the ski-doos is considerably reduced. On the average an Eskimo must buy one new ski-doo track every year.

Given the desire, on the part of the Eskimo hunter, to employ such machines and weapons, capital is required first to secure the equipment and second to operate it. In addition there are costs of maintenance and depreciation.

INCOME FROM HUNTING

Table 37 shows that the total income from fur sales at Pangnirtung from August 1, 1965 to July 31, 1966 was a little over $66,000 or an average of $584 per household. This average is misleading, however, as it includes the households of the settlement of Pangnirtung where over 12 men are engaged in full time wage employment and many others maintain part-time jobs. In many cases, therefore, hunting opportunities are limited to weekends. Furthermore, there are a number of Pangnirtung households which do not hunt at all (aged, widows, disabled). A small number of hunters from the camps may occasionally work for wages. Nevertheless, the total amount earned from wage labour by the Cumberland Sound camp population is about one fifth of that earned by the residents of Pangnirtung. If the total hunting income from all sources for the camps is divided by the total number of the camp households, the average annual income per camp household is $860. This is more representative of the hunting economy of Cumberland Sound than a figure which includes Pangnirtung. Average income per camp household in Cumberland Sound, including wages and money earned through sales of handicrafts, totalled $911. The difference between the two figures, namely $51, illustrates the primary economic role played by hunting for the camp households. The income of each camp along with their household average for the period August 1, 1965 to July 31, 1966 is found in Table 38. A monthly break-down of hunting income per camp is given in Table 39.

The income per household may vary with individual effort, number of hunters per household and location of the camp site. This can be seen in the following examples. In the case of Twapine, which has the highest household income in Cumberland Sound, their skill and diligence as hunters partly explain their large annual kill of seals. Another factor contributing to their success is the camp's nearness to the floe edge both before and after the stabilization of the central ice. This allows the hunters to hunt both the immature ringed seals which congregate off the floe edge as well as adult seals that live in the fast ice.

Being located at the head of the sound where the ice is most stable, Bon Accord enjoys a high density of ringed seals which is further increased after pupping. Close proximity to tide rips in Clearwater and Kangiloo Fjords and the abundance of ringed seals in the vicinity in July also contribute to the camp's high household income.

Both areas around Twapine and Bon Accord are frequented by large numbers of harp seals. Large kills of these animals by the two camps have bolstered their income because during the period from August 1, 1965 to July 31, 1966, the harp seal was worth an average of $7.84 more than the ringed seal. Table 38 shows that Twapine and Bon Accord have the highest harp seal kills per household for all camps in Cumberland Sound.

The effect of the number of hunters per household is best illustrated by comparing Imigen and Iglootalik. Although the individual seal kill per hunter * for Imigen is considerably larger than Iglootalik the latter camp has a higher household yield as it has twice as many hunters per household.

The number of hunters per household, however, is not always an important factor as can be seen from comparing Kingmiksoo and Krepishaw. Although this ratio is smaller for Kingmiksoo the household income is much higher. This may be due to the fact that Kingmiksoo is closer to the floe edge and it hunts a large area relatively untouched by other camps.

HUNTING COSTS

The purchase of gasoline and oil is a major item in the costs of the hunt. During the summer of 1966 gasoline sold for $0.98 per gallon and oil for $0.55 per quart. A study of 94 hunting trips carried out during the period from June 11th to August 31, 1966 showed that the average fuel costs per landed seal ranged from $1.89 during break-up to $2.17 during open water (Tables 40, 41, 42).

* A hunter is here defined as a man who has traded at least ten sealskins in one year.

Due to the late start of the field work, data for the spring period on only two ski-doo trips and nine hunts by dog team were collected. It is felt that the data on the two ski-doo trips are insufficient to calculate an average fuel cost for spring but the data is presented in Tables 40 and 44 to give an approximate comparison with the break-up and open water seasons.

When using dogs the only operational cost is ammunition. Dog food is not considered an operational cost as the meat is obtained from the seals killed by the hunter. Fuel for cooking and food for human consumption is not included as the hunter will eat whether he remains at home or goes hunting.

Ammunition costs were calculated using the data from Table 31, i.e. taking into account that the number of rounds of ammunition fired per seal varies with season and species of seal. Also included was the cost of bullets for seals killed but lost because of sinking. Variations in prices due to the calibre of rifle used were also considered. During the spring and break-up periods the heavier calibres are usually used but when hunting in open water a .22 calibre rifle is added to the hunting equipment. Data collected during the summer showed that 41% of the shots fired were .22 calibre*. Harp seals, on the other hand, are usually hunted only with the heavier calibres. On the hunts in which Mr. Haller took part, the heavier calibre rifle used was generally a .222. Using the cost figures of $0.19 per round of .222 calibre ammunition and $0.02 per round of .22 calibre, the total ammunition costs were calculated. Tables 40-42 show that the total operational costs for gasoline, oil and ammunition during break-up were $2.68 for a ringed seal and $4.25 for a harp seal. The respective costs during the open water season were $4.23 and $4.93. Operational costs per landed seal during the spring season were $8.94 for a ski-doo but were only $0.35 when using dogs as there were no fuel costs.

The average prices paid for the ringed and harp sealskins from May to September 1966 were $7.40 and $17.48 respectively. Therefore, the gross profit per landed ringed seal was $4.72 during break-up and $3.17 during open water. The profits for the harp seal during these seasons were $13.23 and $12.55 respectively**. It should be noted that these are the gross profits as maintenance and depreciation costs must be considered. An estimate of depreciation costs is found in Table 43. Under the harsh conditions encountered, the functioning life of many items of hunting equipment is considerably shortened. Unfortunately data are lacking for the winter period and so net profit is only calculated for the spring and summer months. From Table 44 it can be seen that the highest net profit per ringed seal occurred in the spring if a dog team was used.

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* Of 291 shots recorded, 119 were .22 calibre and 172 were .222 calibre.

** During spring when dogs were used the gross profit was $7.05 and -$1.54 when a ski-doo was used.

PRODUCTS OF THE HUNT

The seal harvest for each camp area is presented in Table 45 and shows that highest hunting pressure is in the vicinity of Imigen, In examining these figures it should be kept in mind that most of these areas overlap one another (Maps 16 and 17) and this is why the average number of seals landed per square mile for all of Cumberland Sound is greater than the highest yield for a single camp.

Although the hunt has developed into a commercial undertaking it still provides the Eskimos with many of the traditional by-products. Meat, primarily that of the seal, is the staple food of the Cumberland Sound Eskimos and the meat from almost 9,000 seals was available for food during the period from August 1, 1965 to July 31, 1966.

The seal carcass is the principal source of dog food. During the spring and break-up periods, it was found that the consumption of seal meat, bones, blubber and viscera by dogs was 0.047 seals per dog per day or 3.95 pounds per dog per day*.

Seal blubber is used for fuel oil in the soapstone lamps (kudliks). The blubber is first rendered by the heat of the sun and then stored for use during the winter months. Four kudliks per tent are reported to provide sufficient heat.

A number of seal skins (fewer than ten) are kept by most households for domestic purposes. Kamiks or boots are usually made from the skins of the ringed and bearded seals. Dog traces, travelling bags and rifle cases are also produced from these skins.

The efficiency of utilization of these by-products varies greatly between the settlement of Pangnirtung and the camps of Cumberland Sound. In the camps there is generally a greater efficiency in the use of the seals. Whereas seal meat is the staple food of the camp people, the inhabitants of Pangnirtung depend to a much greater extent upon processed foods imported from the south which they purchase at the stores in the settlement.

This same trend holds true for the utilization of seal meat for dog food. In the camps the number of dogs per hunter is greater than in Pangnirtung where a large number of hunters use ski-doos. This has had an adverse effect on the efficiency of utilization of seal meat. In the camps most of the seal meat not eaten by the people is stored for dog food but in Pangnirtung there is evidence of indescriminate waste.

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* The average weight of the seals was calculated from data in Appendix A using McLaren's formula, relating length to total live weight of skinned animal.

For example, of 11 seals killed on one hunting trip by two native residents of Pangnirtung, using a ski-doo, only three were retained for human or dog consumption; the rest were skinned and the meat discarded.

The same tendency exists in the use of seal blubber for fuel oil. In the camps the kudlik is the principal means of heating and lighting the tents during the winter. In contrast, the residents of Pangnirtung are supplied with oil stoves and free fuel oil and consequently there is no need to store blubber. Unfortunately, at present there is no market for seal blubber or meat.

Dogs and Ski-doos Per Hunter in Cumberland Sound

	Dogs/Hunter	Ski-doos/Hunter
Pangnirtung	4.6	0.4
Twapine	6.3	0.8
Bon Accord	5.6	0.0
Imigen	10.6	0.0
Ikaloolik	7.0	0.0
Keemee	6.8	0.0
Iglootalik	8.2	0.0
Krepishaw	5.1	0.2
Kingmiksoo	5.1	0.1

SUMMARY -

During the late spring hunt it would seem that it is more economical to use dogs as a means of transportation than to use a ski-doo. In this season, an average of over 40 miles are travelled before a seal is landed and therefore the cost of fuel per landed seal is very high. Because of high fuel costs, the profit per sealskin traded is greatly reduced. In fact, for the two ski-doo trips recorded, there was a financial loss. When hunting with dogs, however, the profit per sealskin traded is high because the only operational costs are ammunition.

In mechanized hunting, the net profit per sealskin traded is greatest during the break-up period. Because the immature seals have begun to move in from the floe edge the seal density increases and only 14 miles were travelled before a ringed seal was landed. Therefore, although ammunition costs have increased slightly, the fuel costs are at a minimum.

In both the break-up and open water seasons it can be seen that it is more probitable to hunt harp seals as the net profit from the harp seal is three to four times greater than that earned from the ringed seal.

Figure 20 summarizes the net profit per landed seal and the net profit earned per hunting day during spring, break-up and summer.

CAPITAL GOODS, REGIONAL INCOME AND EXPENDITURES

CAPITAL GOODS

Tables 33 and 47 present an inventory of capital goods related to resource utilization in the survey region and, in particular, the Cumberland Sound camps. Unfortunately, there are little accurate and complete data against which these tables can be compared in order to show the amount or rate of Eskimo investment in hunting equipment. Firearms were probably introduced to the region some time in the mid 19th century but as late as the 1890's not all Eskimos working or living near the relatively prosperous settlement of Blacklead Island had rifles. The majority of outboard motors, high powered rifles such as the .222, .243 and .272 calibers, telescopic sights and ski-doos, have all been purchased within the past decade. For example, in 1962 there was only one native-owned autoboggen in the Cumberland Sound region. By November 1964, there were 17 ski-doos in Pangnirtung and in summer, 1966 the regional total was 36. This number probably doubled by October, 1966. In summer, 1953, the Clyde River area population had only two small, unpowered wooden boats and one 18 foot canoe with an outboard motor. In 1966 the region was serviced by 25 canoes, 27 outboard motors and one large, powered whaleboat. Broughton Island, in 1961, had two canoes and three whaleboats while in 1966 the community had nine canoes, 12 rowboats and six whaleboats. The first two Eskimo-owned autoboggans were used at Clyde River in 1962. Four years later there were seven Eskimo-owned ski-doos in operation.

GROSS REGIONAL INCOME

The economy of eastern Baffin Island began to shift from the traditional self-contained hunting way of life to a quasi-commercial economy soon after European whalers and traders began to frequent the area in the 19th century. Eskimos entered into seasonal employment at the whaling stations and became bound to an outside economy through their continuing desire and need for manufactured goods. Although the annual amount of purchases considered necessary for adequate living were modest the sources of income were also limited. In the Cumberland Sound area seasonal employment at the whaling stations terminated in the early 20th century not to be revived again until the Hudson's Bay Company operated a small station, utilizing white whales, from pre-World War II to 1963. Other sources of employment were restricted to a few individuals hired by the Hudson's Bay Company, the mission and the police. Only during the annual off-loading of store supplies could many people be assured of earning a small sum from wage labour. For the vast majority of all people almost the sole source of income was from the sale of furs, particularly the Arctic fox, weasel and polar bear.

An Arctic hunting economy is subject to rapid and not easily predicted fluctuations. The price of raw furs can change from year to year or even month to month depending upon the world market. For example, the value of white fox, since 1944, has reached a high of $36.00 per pelt in 1945 to a low of $6.50 per skin in 1950. Young ringed seal skins, the silver jar, have increased in value from about $4.00 in 1955 to a high of $17.50 in 1963, while the adult ringed sealskin went from about $1.50 in 1955 to $12.25 in 1963. The seasonal abundance of

different animal species can vary. The fox cycle is an excellent example. In addition, the seasonal migration habits and environmental requirements of certain animals usually make them available, or at least abundant, only at particular locations during restricted seasons. Thus, while the average price of polar bear skins has increased from about $16.00 in 1953 to over $180.00 in 1966, many hunters will rarely have an opportunity to kill the animal simply because it does not frequent their hunting area. Lastly, although fur prices might be high and the animals present within range of a hunter the Arctic environment can prevent a successful catch.

Despite these limitations placed on an Arctic hunting economy the income from the sale of furs has not only sustained the local population for decades but, during the past few years, it has been one of the most rapidly growing sectors of the economy. In 1956, for example, the Cumberland Sound population earned a total of $9,478.00 from furs and $5,048.00 from commercial whaling. This was an average per household income of $115.00. In 1964 the estimated value of the area's fur take was $163,573.00 or about $1,434.00 per household. For the period 1st August 1965 to 31st July 1966 the average Cumberland Sound household earned $629.00 from hunting products (Table 48). Clyde River shows the same pattern of significant increases in earnings from furs. In 1957 the total value of furs traded was $3,678.00 or about $111.00 per household. In 1964 a total of $28,000.00 worth of furs were sold giving an average income of about $609.00 per household. For the period 1st June 1965 to 31st May 1966, however, the per household earnings from furs had decreased to $289.00. Nevertheless, in large part the rapid increase in the amount of capital goods purchased throughout the survey region can be accounted for by the stimulation given the local hunting economy through the rise in sealskin prices.

Of equal or greater importance to the economy has been the increased opportunity since 1941 for seasonal and annual wage employment. The establishment of defense sites at Clyde River and Padloping Island and later at Ekalugad Fjord, Cape Hooper, Kivitoo, Broughton Island, Durban Island and Cape Dyer meant that a relatively large number of families benefited directly from wage earning jobs. In 1956, for example, 13 men from the Cumberland Sound region were employed on the DEW Line. At Broughton Island in 1959, three out of 15 families were directly supported by full time employment. The same pattern was true for Durban Island, Kivitoo and the other sites farther north except for the Loran Station at Cape Christian which has not employed Eskimo labour. As a measure of the overall increase in wage earning opportunities, in 1956 six Eskimos were employed full time in Pangnirtung. By 1961 the number of jobs had increased to 11, another position was opened before 1964 and in 1966 Eskimos occupied 18 full time jobs in the community. Wage earnings from all sources in Pangnirtung increased from an estimated $5,200.00 in 1956 to about $38,863.00 in 1964 and $98,000.00 in 1965. At Clyde River the number of full-time wage earning jobs increased from three in 1953 to seven in 1966. Total

wage earnings, from all sources, increased from about $1,620.00 in 1953 to over $30,000 in 1965.

The last important income source has been social welfare either administered under nation-wide programs such as Family Allowances, Aid to the Blind and Old Age Assistance or as social assistance for particular needy cases. In 1956 welfare payments in the Cumberland Sound region amounted to $26,266.00 and social assistance $3,113.00. The same region in 1964 received about $16,000.00 in welfare and $14,600 in social assistance. Welfare payments at Clyde River in 1955 amounted to $10,892.00 and social assistance $1,889.00. A decade later welfare brought $16,000.00 into the economy and social assistance about $7,000.00.

As can be seen from Table 49 every sector of the economy has tended to grow at a rapid rate during the past decade. Although per capita incomes remain comparatively low in terms of the national average there can be little doubt that the entire survey region has undergone a period of rapid economic expansion since 1956.

INCOME SOURCES

Table 49 presented the generalized gross income for the region and primary sources of earnings before the study period June, 1965 to August, 1966. Income from all sources has increased at a significant rate in the last decade. The steady rise in social welfare earnings is a reflection of population growth, increased life expectancy of the average native resident and periodic needs of individuals or households for direct welfare assistance. Income from native products is based primarily not on production but on the price of raw furs, particularly sealskins. Wage employment earnings have risen because more native people have taken on permanent positions and, of great importance, the government has sponsored construction projects in the major population centres. Tables 50 and 51 present the estimated total Eskimo income from all sources for the period August, 1965 to July, 1966. It can be seen that wage earnings are the single most important income source followed by native products. Table 52 illustrates the significance of wage employment with relation to total earned income. About 65% of the region's earned income is from wages and 35% from the sale of native products.

Wage Employment: The shift in the region's economic base, from the sale of native products to wage employment, can not be over-emphasized. But it is important to look closely at these two primary income sources in order to understand present and future economic trends. Table 53 shows that out of a regional total of 1,114 persons 41 held permanent wage positions and 19 part-time positions in the study period, June 1965 to August 1966. These figures do not include, however, individuals who received pay as casual labour, particularly on local construction projects. Government spending, Table 54, accounts for about 65% of all native wage earnings and non-government spending about 35%. The most important aspects of this wage employment are presented in Tables 55 and 56. It

can be seen that the region is divided into two groups. Pangnirtung and Broughton Island received relatively high incomes from casual labour, construction expenditures and employment on the DEW Line while Padloping Island and Clyde River did not benefit from these income sources to a large degree. Although the figures given here represent an estimate based on incomplete data, the importance of wage labour for the DEW Line and casual employment is evident (Table 57).

It can be seen that a decline in casual labour earnings and employment on the DEW Line would seriously affect the economy of Pangnirtung and Broughton Island. The two communities are likely to suffer an economic decline when present building programs are completed, perhaps in 1968-69. Although the future of the DEW Line is unknown, there are indications that technological developments and shifts in strategic policy will result in a curtailment of many functions of the system. Again, it might be argued that this will probably occur before 1970. The conclusion to be drawn is, therefore, that while the local economies of Pangnirtung and Broughton Island provide present native residents with incomes significantly higher than Padloping Island and Clyde River, the last two mentioned areas are less likely to suffer economic declines through the loss of wage employment. Indeed, Padloping and Clyde will probably show important increases in wage earnings during construction phases planned for the two sites in the coming years. In any event, should present trends continue and no new industrial development or community or regional construction projects be started, it is predicted that the regional economy will steadily revert to the pre-1956 structure whereby the sale of native products will be the single most important income source. Data given in Tables 49 and 50, however, suggest that fur prices may continue to drop in the immediate future. Regardless,it is clear that the one sector of the economy that requires careful consideration is the utilization of biological resources.

Utilization of Biological Resources

Present statistical reporting procedures, while they do not give completely accurate information on all wildlife harvested, are complete enough to provide an excellent approximation of biological resource utilization. They are particularly valuable to an economic analysis because they usually report all furs traded as well as estimated total harvest. It can be seen in Tables 58 and 59, for example, that in the Cumberland Sound region the estimated kill of ringed seals in 1958-59 far exceeded the number of pelts traded. By 1963-64 the situation had completely changed. By that date all, or nearly all, ringed seals killed were also traded. At Clyde River, however, the estimated catch of ringed seals has not equalled the number traded although skins sold increased threefold between 1955-56 and 1965-66. As stated earlier, most of the important biological resources vary in their abundance and distribution from season to season. These variations are not necessarily evident in game reports but can be identified in fur trader returns. For example, some of the data listed

in Tables 60, 61 and 62 are illustrated graphically in Figures 21, 22 and 23. The importance of spring and early summer hunting in all areas is easily seen.

Data on operating costs for resource utilization during the period August, 1965 through July, 1966 are shown in Tables 63, 64 and 65. It can be seen that the average household in the Cumberland Sound region spent $493.00 on ammunition and motor fuel, in the Broughton and Padloping Island area $433.00 and at Clyde $178.00. These expenditures amounted to 23% of the total income for Cumberland Sound during the above period, 16% of the Broughton and Padloping Islands' total income and 12% of the Clyde area's total income.

Earnings gained during the rapid economic growth in the region after 1956 were invested, in large part, in capital equipment such as boats, rifles and motors. This investment continues both to cover depreciation costs and to acquire new equipment, such as outboard motors, telescopic sights and ski-doos not possessed by particular households in the past. From August 1965 through July 1966, investments in hunting equipment averaged $319.00 per household in Cumberland Sound, $432.00 per household in the Broughton and Padloping Islands area and $169.00 in the Clyde region. These expenditures amounted to about 15% of the total income of the three population groups in the survey region.

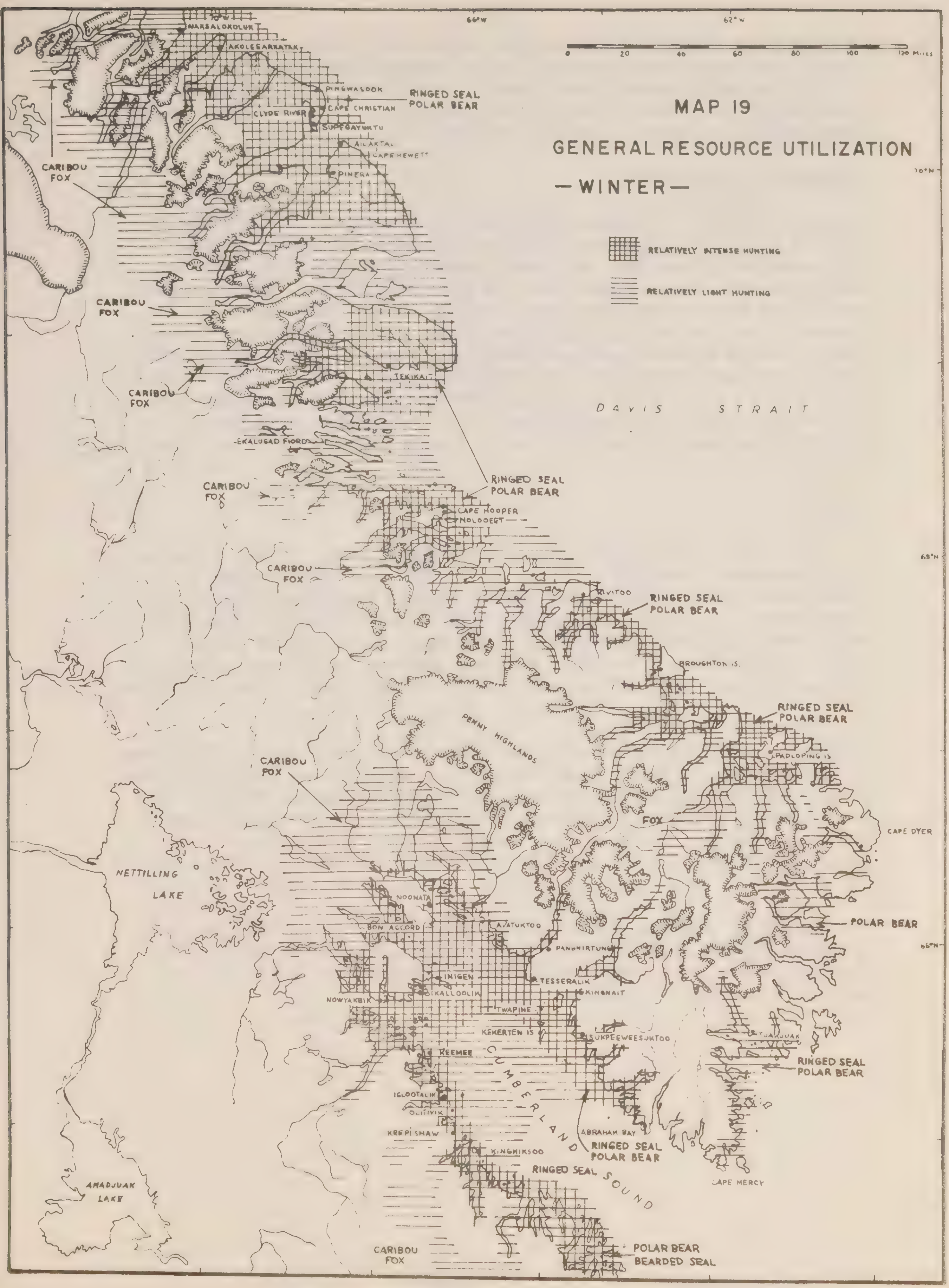
Depreciation costs of equipment are difficult to calculate because they depend upon user skill, proper maintenance techniques and the particular product capabilities as set by the manufacturer. In many cases, however, the equipment in use was designed and developed for recreation in the temperate zone. For this reason Arctic operating and depreciation costs are normally much higher than those specified by the manufacturer. A study of ski-doos used as work vehicles in the survey region suggests that maintenance costs may reach $250.00 per year after the first six months of operation and depreciation costs $200 or more per annum.

FOOD PRODUCTION AND COSTS

The fact cannot be over emphasized that the harvest of biological resources in the survey region, although in part a commercial activity, is basically a way of life. During the period August, 1965 through July, 1966, the Eskimo people of the region probably harvested 1,394,700 pounds of food (Table 66) from the resource utilization areas shown in maps 18 and 19. The average cost per pound of edible food varied from $0.07 in Cumberland Sound and the Broughton-Padloping Island area to $0.03 in the Clyde River region.

A portion of the food harvest is used to support dog teams which are still essential for many households. The number of dogs is decreasing, however, as ski-doos are purchased in greater and greater numbers. A survey of the Cumberland Sound region in 1962, before the dog epidemic of that year, reported that most camps had about 50% more dogs than recorded in summer, 1966. In most cases in summer, 1966, it was noted that hunters with ski-doos kept few, if any, dogs.


MAP 18
GENERAL RESOURCE UTILIZATION
— SUMMER —
RELATIVELY INTENSE HUNTING
RELATIVELY LIGHT HUNTING
INTENSITY OF RESOURCE USE UNCERTAIN
0 20 40 60 80 100 120 Miles
70°W
66°W
62°W
70°N
68°N
66°N
DAVIS STRAIT
NAKSALOKOLUK
RINGED SEAL
AKOLEEARKATAK
PINGWASOOK
CLYDE RIVER
CAPE CHRISTIAN
SUPEGAYUKTU
RINGED SEAL
NARWHAL
AILAKTALI
CAPE HEWETT
PINERA
WALRUS
CARIBOU
CARIBOU
CARIBOU
TEKIKAIT
RINGED SEAL
BEARDED SEAL
NARWHAL
RINGED SEAL
HOME BAY
EKALUGAD FIORD
CARIBOU
RINGED SEAL
CAPE HOOPER
NOLOOEGT
BROUGHTON AND PADLOPING ISLANDERS TO HOME BAY FOR CARIBOU
WALRUS
KIVITOO
RINGED SEAL
BROUGHTON IS.
WHITE WHALE
PADLOPING ISLANDERS TO BROUGHTON IS.
RINGED SEAL
HARP SEAL
PADLOPING IS.
PENNY HIGHLANDS
CAPE DYER
CARIBOU
WHITE WHALE
NETTILLING LAKE
NOONATA
CARIBOU
BON ACCORD
AJATUKTOO
PANGNIRTUNG
HARP SEAL
IMIGEN
TESSERALIK
NOWYARBIK
IKALLOOLIK
KINGNAIT
TWAPINE
KEKERTEN IS.
SUKPEEWEESUKTOO
TUARJUAK
RINGED SEAL
KEEMEE
RINGED SEAL
CUMBERLAND SOUND
CARIBOU
IGLOOTALIK
OLITIVIK
WHITE WHALE
KREPISHAW
ABRAHAM BAY
KINGMIKSOO
CARIBOU
RINGED SEAL
WALRUS
RINGED SEAL
CAPE MERCY
AMADJUAK LAKE
CARIBOU



MAP 19
GENERAL RESOURCE UTILIZATION
—WINTER—
RELATIVELY INTENSE HUNTING
RELATIVELY LIGHT HUNTING
0 20 40 60 80 100 120 Miles
66°W
62°W
70°N
68°N
66°N
DAVIS STRAIT
NARSALOKOLUK
AKOLEGARKATAK
PINGWASOOK
CAPE CHRISTIAN
CLYDE RIVER
SUPEGAYUKTU
AILAKTAL
CAPE HEWETT
PINERA
RINGED SEAL
POLAR BEAR
CARIBOU
FOX
TEKIKAIT
EKALUGAD FIORD
CAPE HOOPER
NOLOOEET
RIVITOO
BROUGHTON IS.
PADLOPING IS
PENNY HIGHLANDS
CAPE DYER
FOX
POLAR BEAR
NETTILLING
LAKE
NOONATA
BON ACCORD
AJATUKTOO
PANGNIRTUNG
IMIGEN
IKALLOOLIK
TESSERALIK
KINGNAIT
NOWYAKBIK
TWAPINE
KEKERTEN IS
SUKPEEWEESUKTOO
KEEMEE
TJARJUAK
CUMBERLAND SOUND
IGLOOTALIK
OLITIVIK
KREPISHAW
ABRAHAM BAY
KINGHIKSOO
RINGED SEAL
CAPE MERCY
AMADJUAK
LAKE
POLAR BEAR
BEARDED SEAL

Food production in 1956-66, in the three study areas (Table 66) was about 1,200 pounds per person. It is assumed that probably 58% of all edible food products were used to feed dogs. The remaining food would, therefore, provide each inhabitant in the survey region with about 1.4 pounds of edible food per day.

INCOMES AND EXPENDITURES

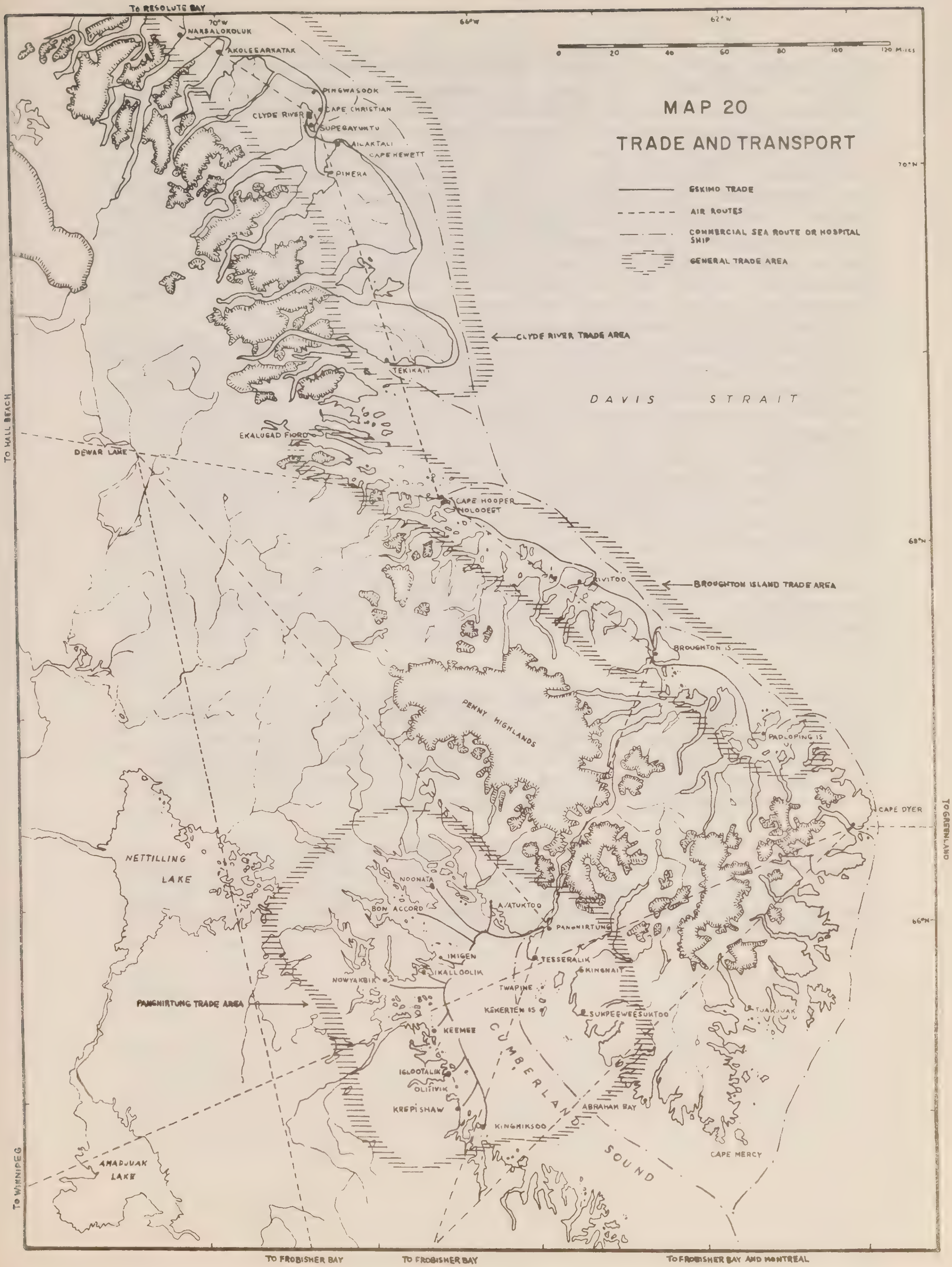
It can be seen from information given in Tables 63 and 64 that in 1965-66 the average household in Cumberland Sound spent $1,204 for essential groceries, equipment, ammunition and fuels. In the Broughton-Padloping Island area the average spending, per household, was $1,374 and in the Clyde River region, $799. Data given in Tables 67 and 68 indicate that for almost all camps and settlements these average expenditures are less than annual incomes calculated for the period August, 1965 through July, 1966. Four camps in the Clyde River area, however, do not receive yearly incomes that meet the average household expenditures. All remaining camps are receiving incomes extremely close to the average expenditure level for essential goods.

SUMMARY

In summer 1966, the Eskimo population of the survey region totalled 1,114 persons. About 62% of the population was concentrated in four settlements, Pangnirtung, Padloping and Broughton Islands and Clyde River. The remaining people were settled in eight camps in the Cumberland Sound region and eight camps in the Clyde River area. All settlements showed the same general population structure of about 50 per cent of the inhabitants in age groups under 15 years old.

Although traditionally hunting has been the primary source of income for the region, and continues to be for a majority of the population, since 1956 earnings from wage employment have equalled or exceeded the income from native products. In the past decade income from three sources, native products, wages and social benefits, have increased by about 300 per cent. The average annual household income has risen from about $500.00 in 1956 to $2,100.00 in 1965.

The region is a whole has benefited from expenditures related to national defense, the rise in fur values, particularly sealskins, and government investments in schools, departmental buildings and general community development projects.


MAP 20
TRADE AND TRANSPORT
ESKIMO TRADE
AIR ROUTES
COMMERCIAL SEA ROUTE OR HOSPITAL SHIP
GENERAL TRADE AREA
0 20 40 60 80 100 120 Miles
70° W
66° W
62° W
70° N
68° N
66° N
TO RESOLUTE BAY
TO HALL BEACH
TO WINNIPEG
TO GREENLAND
TO FROBISHER BAY
TO FROBISHER BAY
TO FROBISHER BAY AND MONTREAL
NARSALOKOLUK
AKOLEEARKATAK
PINGWASOOK
CAPE CHRISTIAN
CLYDE RIVER
SUPEGAYUKTU
AILAKTALI
CAPE HEWETT
PINERA
CLYDE RIVER TRADE AREA
TEKIKAIT
DAVIS STRAIT
EKALUGAD FIORD
DEWAR LAKE
CAPE HOOPER
NOLOOEET
KIVITOO
BROUGHTON ISLAND TRADE AREA
BROUGHTON IS
PENNY HIGHLANDS
PADLOPING IS
CAPE DYER
NETTILLING LAKE
NOONATA
BON ACCORD
AJATUKTOO
PANGNIRTUNG
IMIGEN
IKALLOOLIK
NOWYAKBIK
TESSERALIK
SKINGNAIT
TWAPINE
KEKERTEN IS
SUKPEEWEESUKTOO
TUAKJUAK
PANGNIRTUNG TRADE AREA
KEEMEE
IGLOOTALIK
OLITIVIK
KREPISHAW
KINGMIKSOO
ABRAHAM BAY
CUMBERLAND SOUND
CAPE MERCY
AMADJUAK LAKE

The hunting industry of eastern Baffin Island has now reached a critical stage where, in almost all cases, income from the sale of native products is not sufficient to cover current operating and depreciation expenses. The difference is made up by basic welfare income and, in some cases, social assistance and wage employment. The industry was able to modernize during a period of high income from seasonal wage employment and increased sealskin prices. Recently, however, the steady decline in the value of furs has resulted in an ever decreasing profit margin for the hunter. Some support of a modern hunting industry would seem reasonable. First, the resource base is relatively secure. McLaren has calculated that the region should sustain a yield of about 14,000 ringed seals per year. At present the yield is slightly higher than this figure but reports dating back to the 19th century suggest the region is capable of supporting the higher seal harvest. It should be pointed out, however, that resource utilization is now relatively intense in most areas. Regions that are not heavily hunted may act as resource reservoirs from which animals migrate into hunted areas. For these reasons, it must be assumed that the present level of production, for most animals, cannot be materially increased. On the other hand, certain species probably can withstand increased utilization. These include the white whale and Arctic char.

Second, the harvest of biological resources not only supplies most households with an essential cash income but it provides them with food products necessary for the maintenance of physical and mental health.

Third, it is suggested that if the hunting industry is allowed to decline to a point where it is no longer viable then most residents will lose confidence in their environment and the skills necessary to exploit it. Should there be no alternate economic opportunities open to former hunters then one can expect the population to develop a way of life based on direct social assistance.

Fourth, a healthy, well managed hunting economy would support a population able and willing to make individual choices of new economic and social goals. A developing wage employment economy will find its best labour potential among individuals confident in their ability to earn a living from their own skills and initiative.

CONCLUSIONS AND RECOMMENDATIONS

SUMMARY - HUNTING ECONOMY OF CUMBERLAND SOUND

Trade between the people of Cumberland Sound and the Europeans had been established as early as the 1880's. The adaptability of the Eskimos to new ideas and tools has been rapid and they have not hesitated to increase the mechanization of the hunt. With the establishment of the commercial hunt a number of traditional customs have disappeared and the annual summer migration into the interior for caribou has been discontinued. Seal hunting is now a year round occupation,

Importance of the Central Ice of Cumberland Sound: After freeze-up the ice in the centre of Cumberland Sound moves with the winds and tides until mid January. At this time it becomes stable and is joined to the land-fast ice. The strong current between Nuvuk Point and Kaxoudluin Island prevents the floe edge from forming beyond these points. The position of the floe edge depends on the stability of the central ice. After January the central ice provides an additional area suitable for the pupping of ringed seals. Therefore, the winter estimate of 68,600 ringed seals in Cumberland Sound should be revised to 74,100. Before January, seal hunting is limited to the fast ice areas and, since the central ice does not become fixed to the fast ice until this time, all camps except Bon Accord are able to hunt at the floe edge. After the stabilization of the central ice the position of the floe edge is far removed from most camps and only Twapine, Kingmiksoo and Krepishaw carry out floe-edge hunting to any extent.

Ice Conditions and Hunting Methods: Travelling and hunting methods are directly related to the seasonal ice conditions. During spring, the solid ice cover is ideal for travelling by dog team or ski-doo, and at this time, some of the longest hunting trips are made. In this period, basking seals are hunted on the ice and the number of shots fired per seal killed is lower than the two following seasons.

With break-up, rowboats and outboard motors are added to the hunting equipment because it is necessary to ferry dogs, ski-doos, and komatiks across the open water areas. This constant change from one means of travel to the other is time consuming and the mileage travelled per day is lowest during this season. By the end of the break-up season seals are shot in the water from ice floes. Because sudden storms can break up the ice and move it out of the sound, hunting is restricted to the vicinity of the camps.

When the ice leaves the sound, hunting is carried out from boats. In this season the first few shots are fired to force the seal to dive and thus tire the animal. This, along with the fact that the target is hard to hit from a boat, accounts for the high number of shots fired per landed seal.

Influence of the Physiography: Ringed seals require fast ice for pupping. Because of the numerous inlets and islands in Cumberland Sound, vast areas of stable ice are anchored during the winter period. The complexity of the coastline assures a high productivity or ringed seals and for this reason the Eskimo winter camps in Cumberland Sound are located on the most complex coastlines.

Coastal configuration is also an important factor during the open water season. In the summer, wind is generally a deterrent to seal hunting. The islands act as windbreaks and provide patches of sheltered water where hunting is feasible. In waters off simple coasts, hunting is limited to periods of low wind velocity. Hunting among the islands, however, has its disadvantages for the islands create shadows which limit the range at which a seal can be spotted.

Ringed Seal Migration: A scarcity of the ringed seals in late summer and their abundance in October suggests that there is a yearly migration in and out of Cumberland Sound. An examination of past fur records showing the monthly sales of sealskins supports this theory.

Ringed Seal Population Dynamics: At present there appears to be maximum utilization of the ringed seal population in the sound. If the population estimate of ringed seals (74,100) is correct, then an unfavourable balance between harvesting and reproduction might exist. McLaren has stated that in order to ensure a constant population the annual kill must not exceed 8% of the seal population but, since 1962, almost 6,000 seals have been killed annually in excess of this quota. Therefore, if the supposed immigration of seals from areas outside the sound is not large enough to sustain the large annual kill and the central ice area only supports as many as predicted, then a serious reduction in the ringed seal population may soon be forthcoming.

Changes in Harp Seal Migration: There is some evidence that the nature of the annual harp seal migration into Cumberland Sound has undergone a change since the nineteenth century. At that time harp seals were only occasionally found at the head of the sound near Bon Accord and these were mostly young seals. The harp seals were reported to disappear at freeze-up and return in the spring for only a short time. In 1966, however, they were abundant at the head of the sound and most of the seals killed were adults. The duration of their stay in the sound has also increased for they are still hunted at the floe edge in January.

Potential Harp Seal Utilization: The pressure on the ringed seal may be somewhat relieved if more hunting is directed toward the harp seal. In determining the permissible annual yield consideration must be given to the effect utilization of the population in other areas has.

Sinking Losses: Sinking is related to both the blubber thickness of the seal and the water density. Many seals, however, will float for a few seconds and in this interval a hunter is still able to retrieve the dead seal. With faster boats, sinking losses are reduced.

Seasonal Variations: Seasonal variations exist in: 1) the number of shots fired per seal killed; 2) distance travelled per hunt; 3) average length of a hunt in days; 4) the number of seals killed per man per day; 5) the number of miles travelled per ringed seal landed; 6) operational costs per seal landed.

Hunting Economics: It is seen that the highest net profit per ringed seal landed occurs during the spring when a dog team is used. However, if seal hunting is fully mechanized, i.e. if a ski-doo is used in spring, then seal hunting is most efficient during the break-up season. At this time gasoline and oil costs per seal killed are at a minimum and the ammunition costs are low. The percentage of ringed seals that sink when killed is about one half of that which sinks during mid-summer and the yield per man per day during break-up is slightly higher than in the open water period and is nearly three times greater than the yield during spring. The net profit per hunting day is also at a maximum during the spring period.

GENERAL

Operating costs for the average Eskimo can be reduced through such projects as adult education programs on equipment, use, maintenance and repair, sealskin preparation and the hand loading of ammunition. Continued direct communication between machine user and manufacturer could result in equipment designed for temperate zone recreation purposes (outboard motors, ski-doos, canoes) being redesigned or adapted to work functions in the Arctic. Hunter efficiences might be improved by increasing the retrieving range through the use of hand thrown hooks. The winter catch of seals might be increased by the introduction of new seal netting techniques and gear. The loss of seals should be reduced by the wise use of seasonal and regional hunting regulations.

The number of new resources that might be exploited are limited. None the less, they do offer promise. The resource potential of the region is shown in Map 6. At least 24 different sites in the region support reasonably large Arctic char populations that are relatively little used at present. The seasonal abundance of white whales in Cumberland Sound and lightly hunted areas of Hoare Bay and Home Bay also might offer areas for limited economic expansion.

Mineral resources of the region hold some promise. A number of minerals, among them soapstone, asbestos, pyrite, magnetite, beryl, graphite, mica, molybdenum, coal, high quality quartz, petrified wood and large garnets are known from several places in the region. To date, however, mining activity has been restricted to a small 19th century venture at Blacklead Island and sporadic geological surveys. An adult education in basic prospecting might result in additional, important mineral finds.

Large scale capital investments in the region have helped the economy immeasurably during the past decade. Communications have benefited from new airfields at Cape Dyer, Broughton Island, Kivitoo, Cape Hooper, Dewar Lake and Cape Christian. Helicopter pads were constructed at Durban Island and Ekalugad Fjord. In addition, high quality voice radio and telephone service was made available to most of the region. Other capital investments have been in the field of education, health and general housing. In all cases the local population has benefited from these investments through wage earnings and the services provided.

Earlier it was said that an economic decline can be expected when the present construction phase is complete and if and when the DEW Line curtails its operations. These two events need not mean an end to the regional capital investment program, however. Airfields are badly needed at Padloping Island, Pangnirtung and Clyde River. A program of building small emergency airstrips at suitable locations throughout the region would also contribute to general development. A series of trail cabins might be erected in association with these fields or at sites with future resource exploitation potential. Combined with an imaginative program of community development projects in the field of basic services, such as water, sewage, roads and docking facilities, the regional capital investments could bring seasonal wage employment to an important segment of the population.

Lastly, the steady development of a service industry would add permanent wage earners to the economy. Small engine repair shops, coffee shops and movie theatres, nurse's aides, post office and general communication employees, conservation officers and meteorological observers are some of the potential positions open for development. New wage earning opportunities need not be restricted to the local region. Seasonal employment, even of relatively unskilled labour, in the large metropolitan centres of eastern and central Canada is a real possibility.

An economic development plan for the survey region that takes into account direct methods by which the existing economy can be strengthened while at the same time it develops immediate resources known to offer profitable returns, can increase the annual earned income of most households. These developments should be linked to wage labour projects designed to increase capital improvements, such as airfields, docks, roads and community services, that will increase the seasonal wage earnings and provide on-the-job training for a number of individuals. These projects should be planned to occur during periods of low economic returns from the resource harvesting industry. The era of biological resource exploitation has reached a point where further expansion is limited. The phase of military defense building and maintenance is nearing a close. Capital investments in basic community services and housing will be complete within the next few years.

Mineral deposits, although a possibility for a future industry, have yet to be discovered in economically worth-while amounts in the immediate region. The future Eskimo population of the east coast therefore may find themselves residents of a dormitory area with a depressed economy. Such circumstances could lead to a culture of poverty based on government relief. But another road, if taken, could lead to steady economic development and a population capable of moving into diversified

activities as opportunities appeared. This second road is an imaginative, well supported program of regional and community economic planning and investment.

SPECIFIC RECOMMENDATIONS FOR DEVELOPMENT

The following pilot projects are suggested in the field of biological resource utilization.

(a) In Cumberland Sound the potential white whale fishery should be investigated in greater detail. This study should include a careful market and cost analysis to assure each portion of the whale has a defined value and use. Consideration should be given to the possible lease of Hudson Bay whale processing facilities at Pangnirtung.

(b) The char fishery potential of Cumberland Sound should be assessed by fisheries biologists and a number of pilot fishing projects. Combined with this study should be an analysis of known and possible markets for an assortment of char products.

(c) An assessment should be made of nesting eider ducks in Cumberland Sound to see whether or not an eider-down industry would be profitable.

(d) For the survey region as a whole consideration should be given to a program whereby locally processed wildlife foods can be certified for sale through retail outlets.

(e) At Padloping Island a pilot project should be started to assess the value of a dried char fishery. Biological studies should be started to determine sustained yields of char and possible catches of cod in this area.

(f) At Kivitoo, north of Broughton Island, investigations should be made of a potential char and lake trout fishery.

(g) For the survey region as a whole more consideration should be given to the use of seal nets, especially during the winter period. A study of hunting efficiencies of seal net and seal hole hunting with rifles, or open lead hunting, should be undertaken.

(h) At Clyde River the possible use of nets for narwhal hunting should be investigated. The char fishery potential should also be established.

(i) In Home Bay biological studies should be undertaken to determine the population size of ringed seals, char and cod. It is suggested that resource utilization in this area can be increased.

(j) Field investigations should be made of the Hoare Bay region to determine whether productivity in the area would provide a periodic exploitation.

The following is recommended in regard to the mineral potential of the region:

(a) For the survey region as a whole educational programs should be started to acquaint hunters with valuable minerals possibly located in their home areas. Hand samples of these minerals should be on display in local stores or schools. Information on how ore samples should be taken and forwarded for identification and how claims should be staked should be made readily available to local residents.

(b) Soapstone deposits in the Cumberland Sound area should be investigated in detail.

(c) Soapstone deposits south of Clyde River should be investigated.

(d) Soapstone south of Padloping Island should be investigated.

The following pilot projects could be started to develop a future tourist industry:

(a) Unused, small houses replaced by new low-rent houses could be dismantled and placed at sites convenient to local travelling parties and possible sportsmen. In Cumberland Sound special attention should be given to Pangnirtung Pass and suitable char streams at the north end of the Sound. Between Padloping and Broughton Islands cabins could be placed to be convenient for winter travelling parties and summer fishing expeditions.

(b) The possible use of Fox Delta at Kivitoo as a sportsman centre should be investigated. Adequate airfield facilities are already provided. The region supports good marine mammal, char and trout populations.

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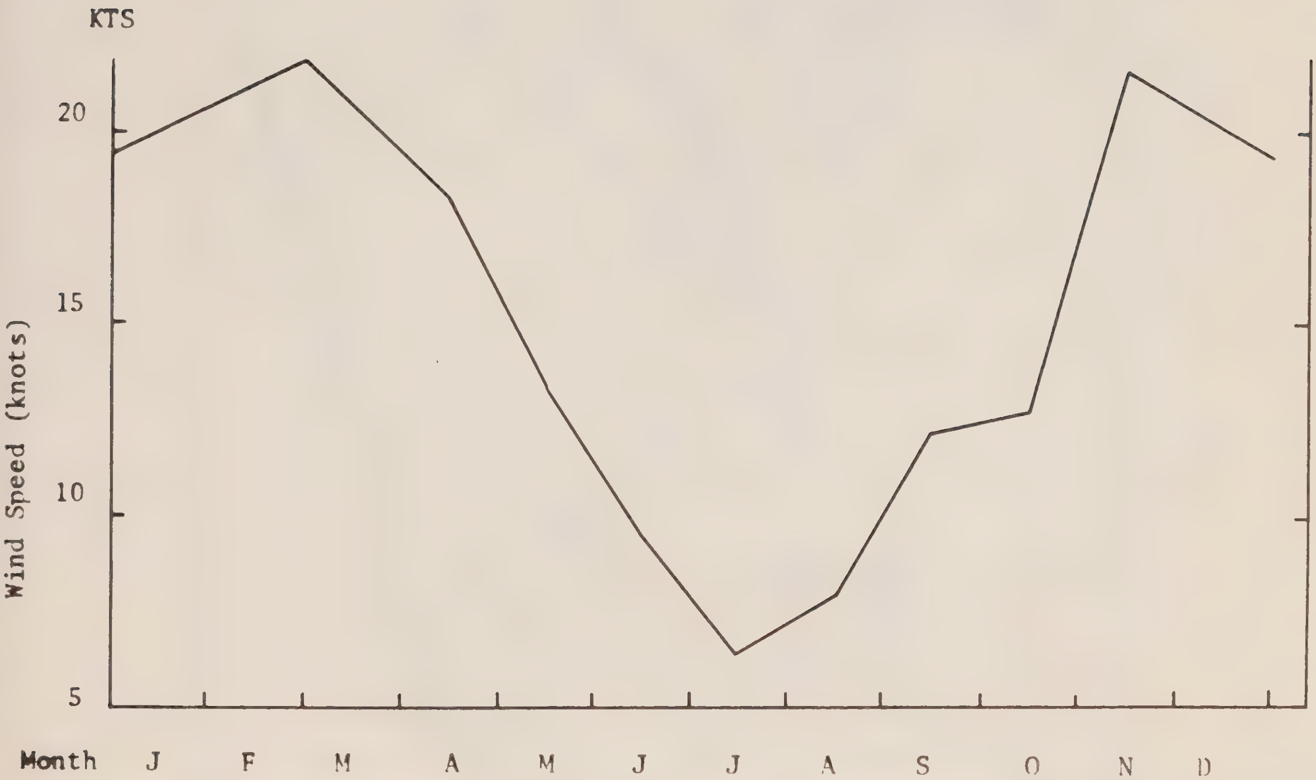


FIGURE 1 - Mean Wind Speed (knots) in Baffin Bay at Latitude 65° to 70° N (taken from Walmsley, 1966)

Precipitation - The increased cyclonic activity of summer, especially with respect to relatively warm, moist air masses moving from the west, leads to precipitation maximums during the period July through October. Coastal stations and higher elevations may receive relatively heavy precipitation even in the winter months (Table 9). Although snow can be expected to fall at all stations at any month of the year, continuous snowcover at low elevations usually lasts from late September through May. Autumn and spring are likely seasons for comparatively heavy snow falls.

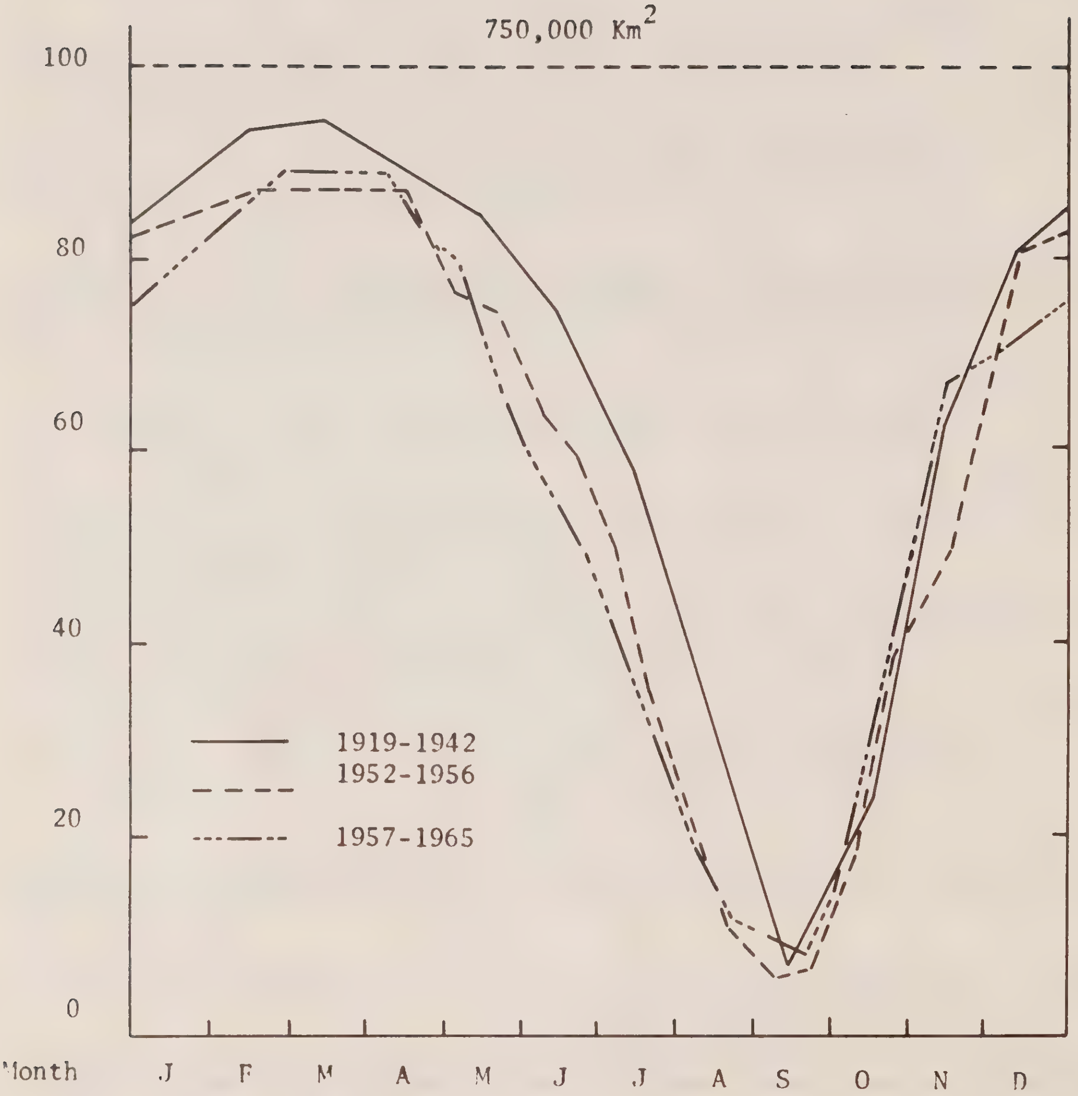
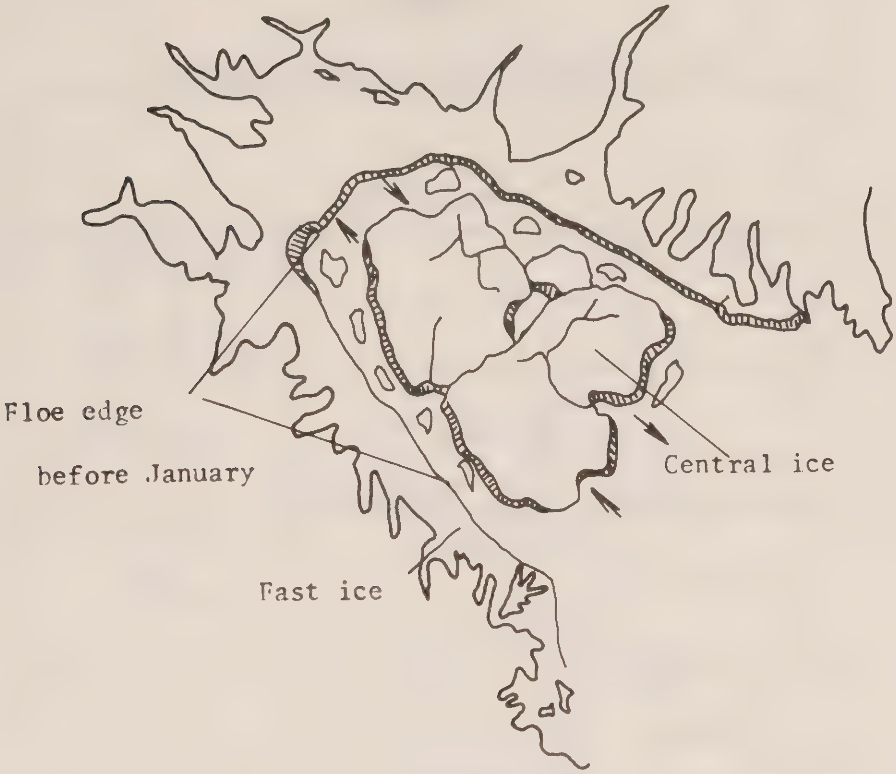


FIGURE 2 - Variation in Mean Ice Cover in Baffin Bay.
(taken from Walmsley, 1966).

Fast and Central Ice, Cumberland Sound

Figure 3



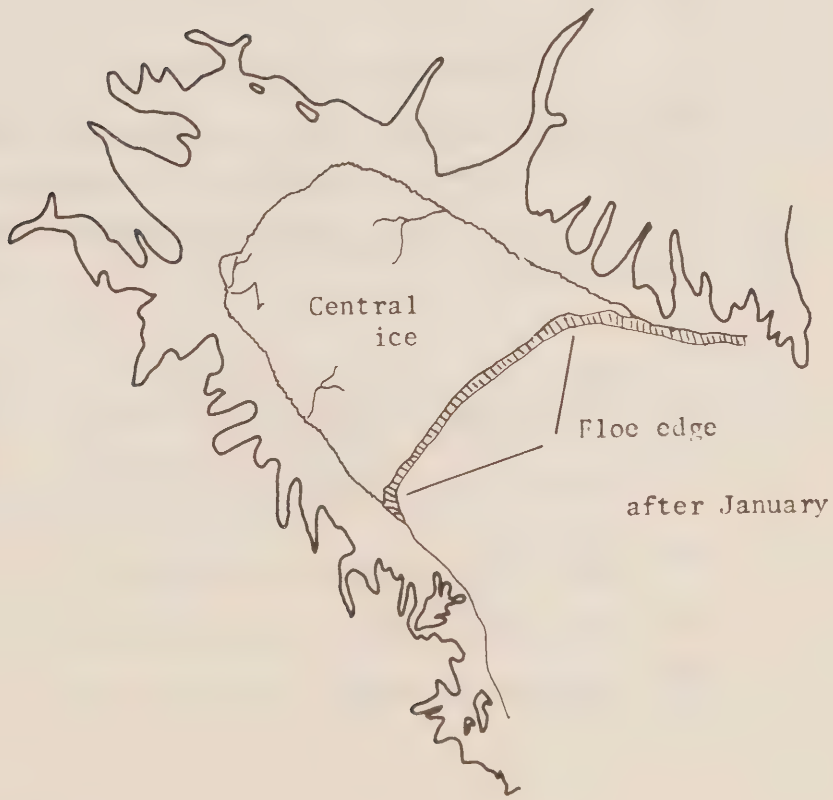
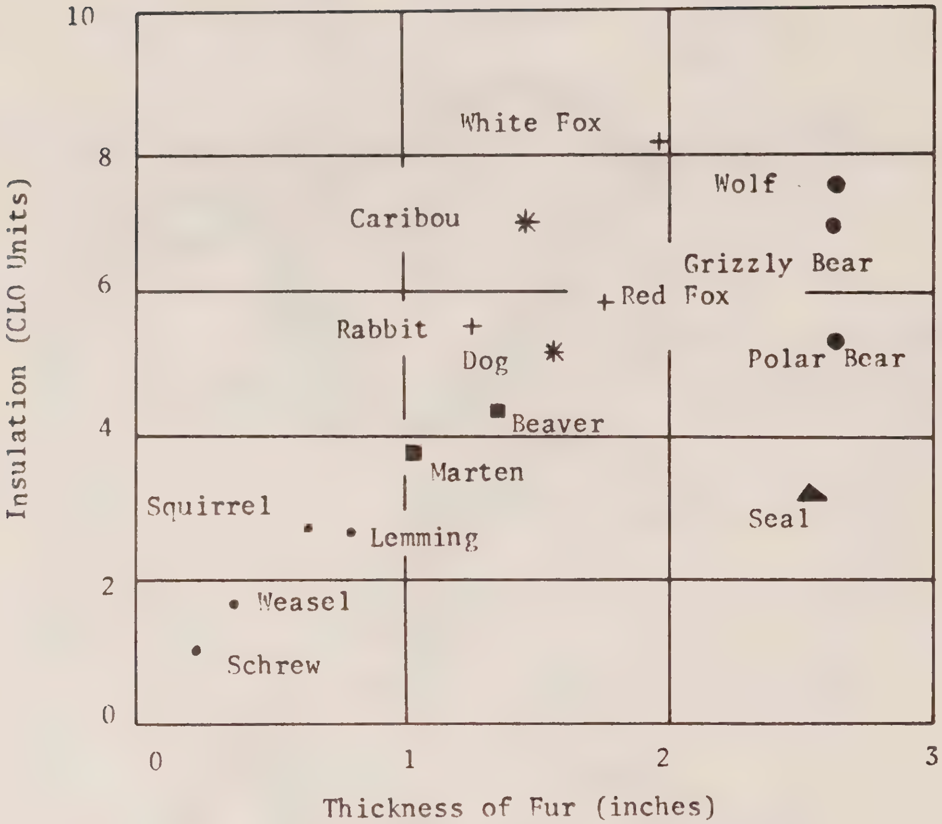


FIGURE 4



Insulating capacity of fur. A 'clo unit' equals the amount of insulation provided by the clothing a man usually wears at room temperature (adapted from Irving, 1966).

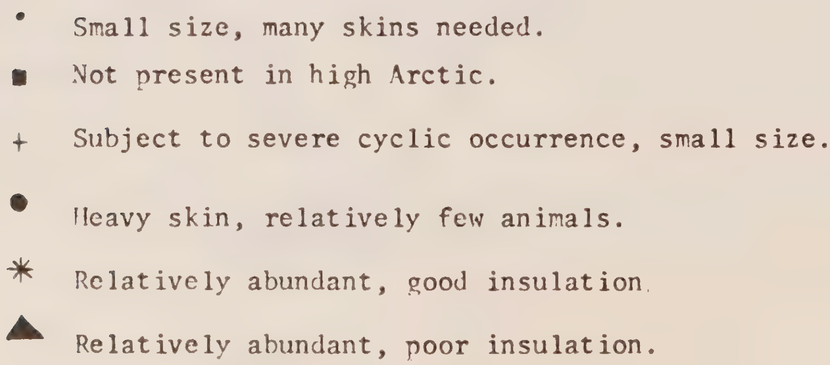
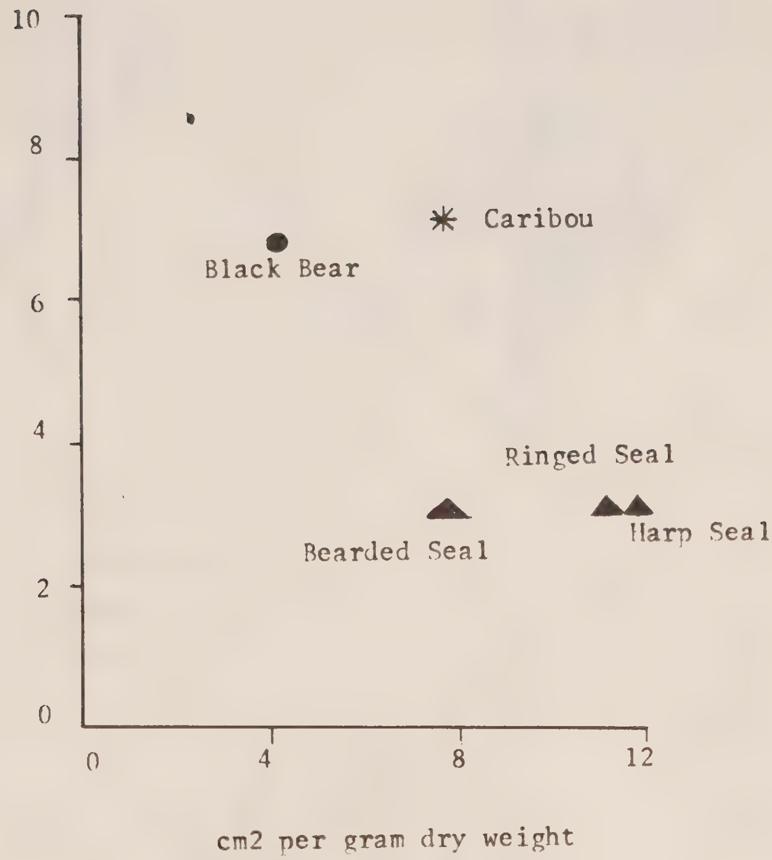


FIGURE 5

Insulating Capacity and Area per Gram.



Insulating capacity of fur and area per gram of dry weight.

FIGURE 6

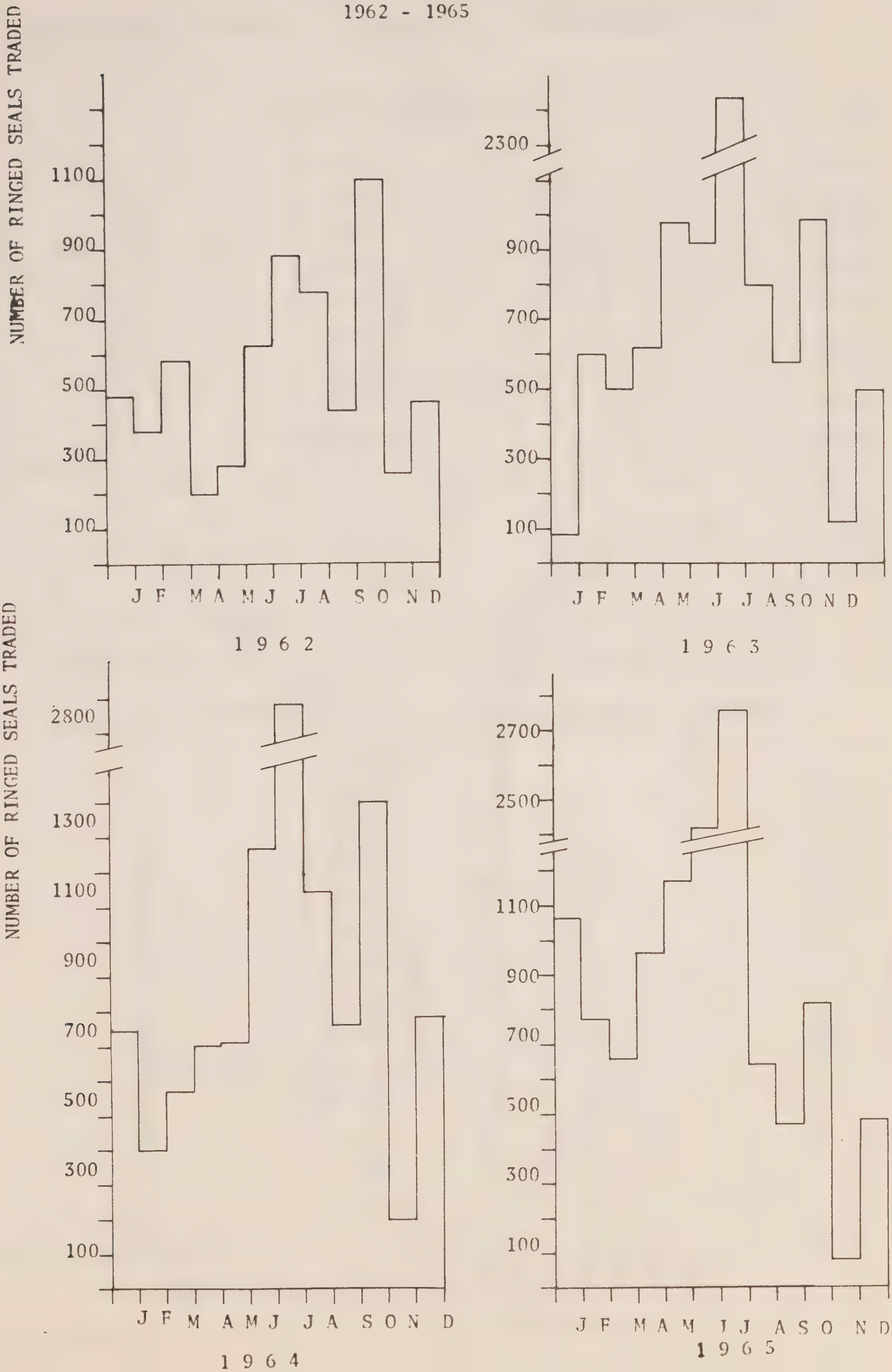
Theoretical Seasonal Distribution, Ringed Seal, Cumberland Sound

Modified from McLaren

FIGURE 7

Sealskins Traded into Pangnirtung

1962 - 1965



August 1966

POPULATION PROFILES

FIGURE 8 - Pangnirtung

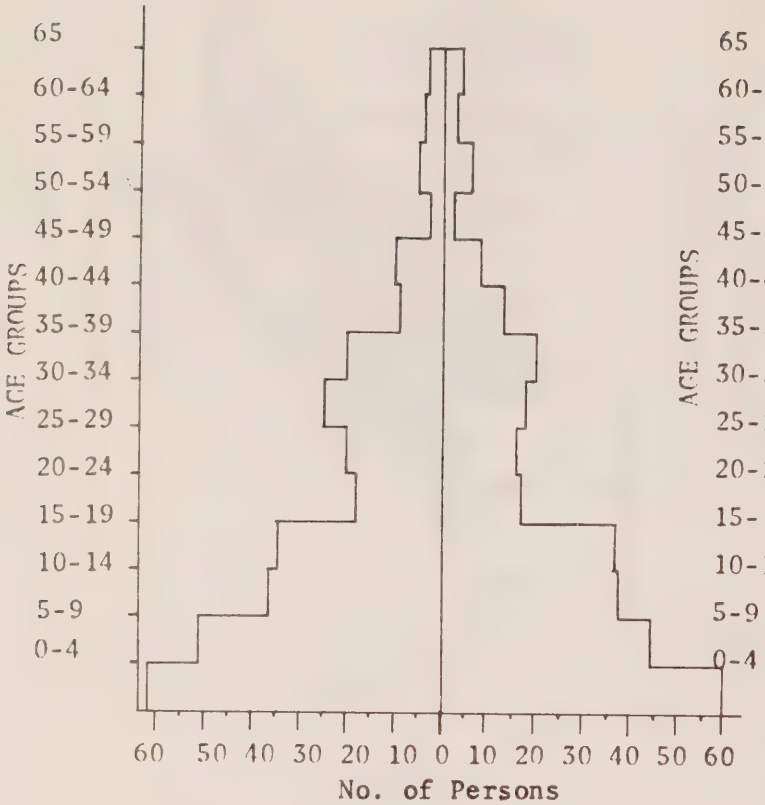


FIGURE 11 - Clyde River

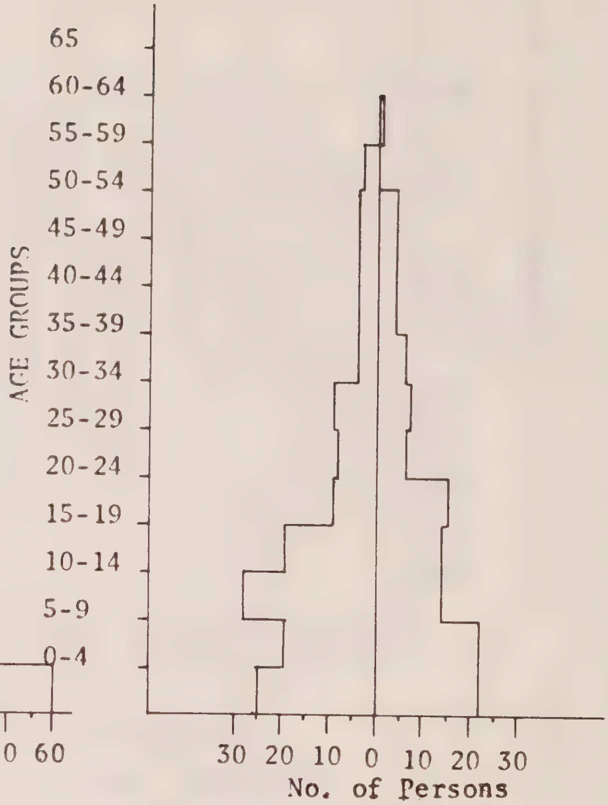


FIGURE 9 - Broughton Island

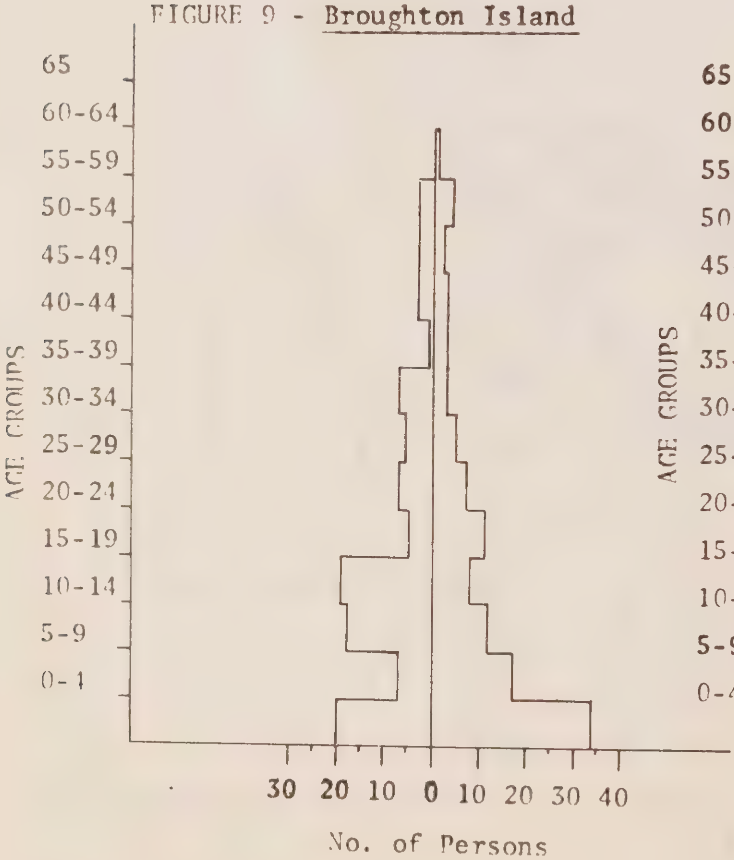


FIGURE 10 - Padloping

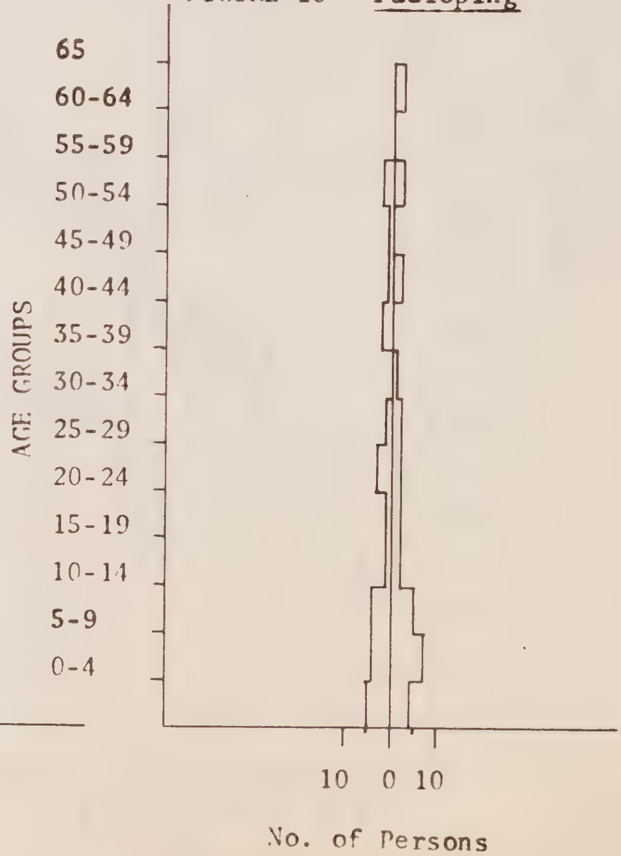


FIGURE 12

Ice Roads, Pangnirtung

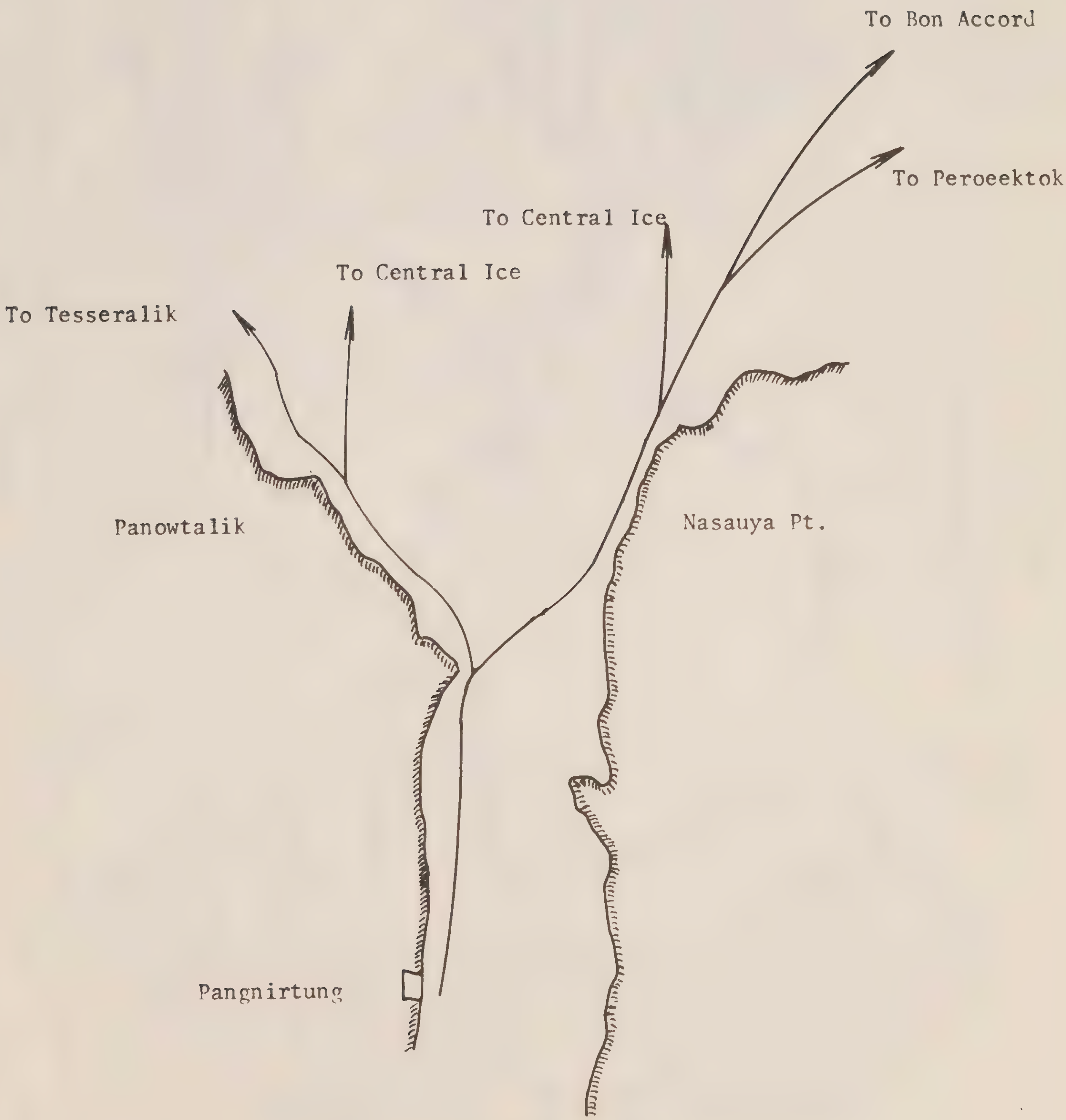
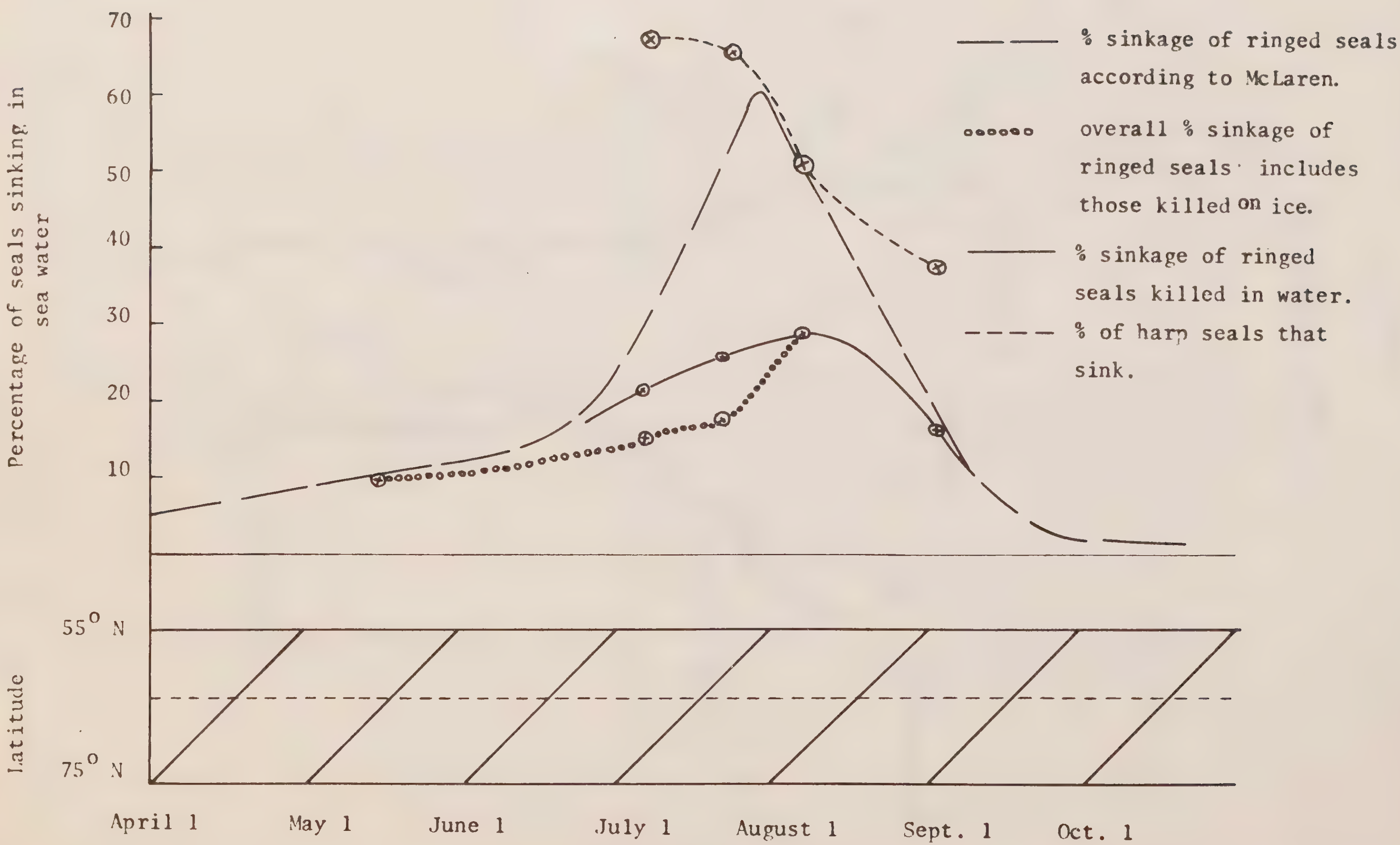


FIGURE 13

Seasonal Sinking Losses



Effect of Wind Direction

FIGURE 14

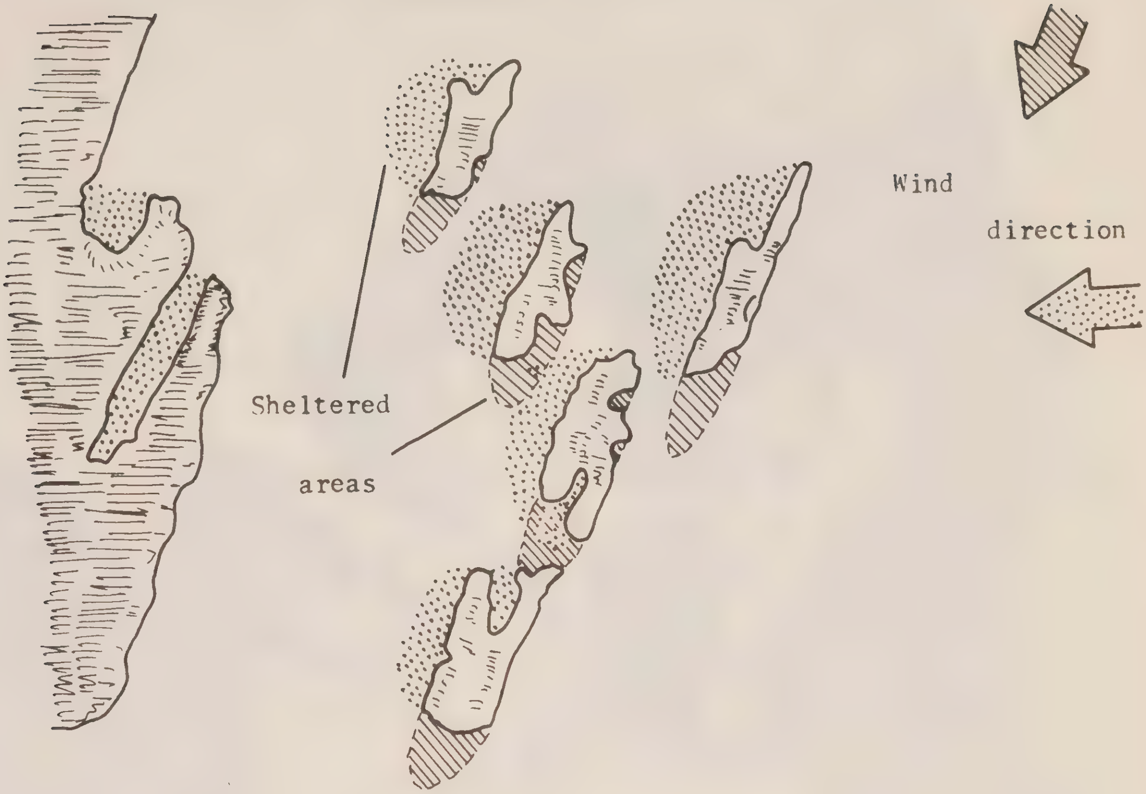
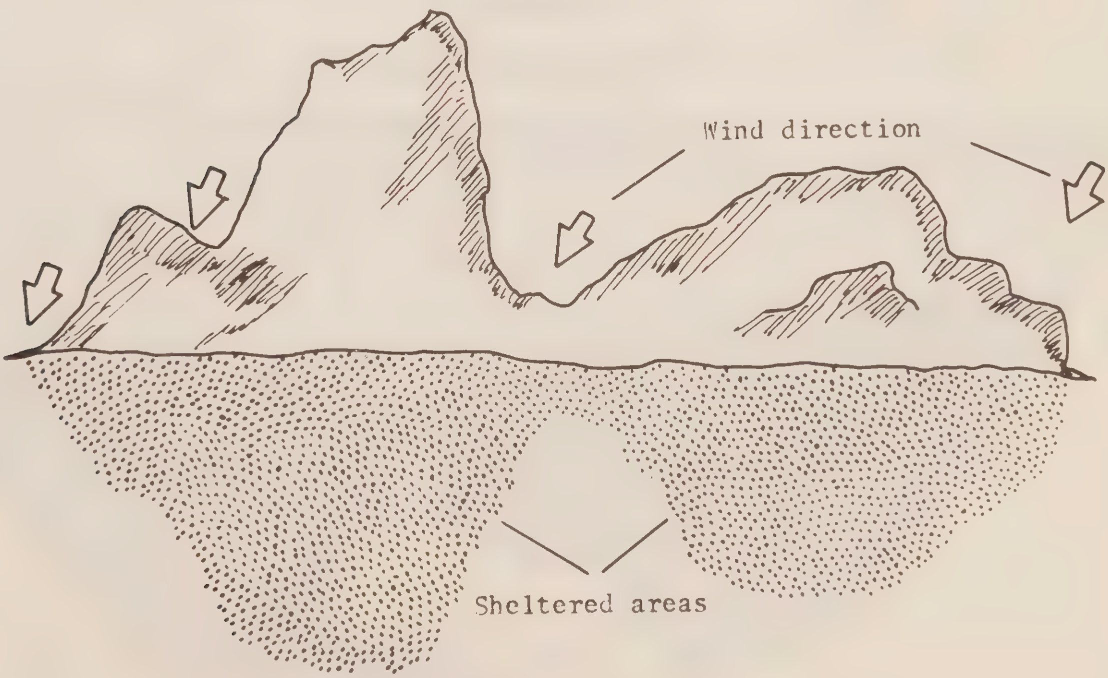


FIGURE 15

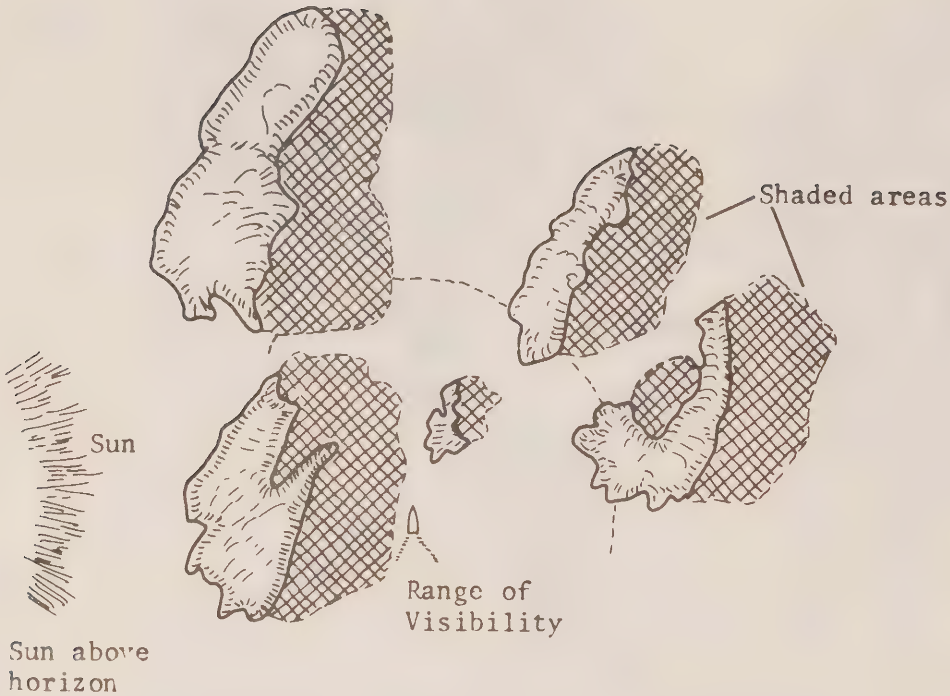
Sheltered areas change with the wind direction according to the configuration of coastline.



Sheltered areas are directly related to the topography

FIGURE 16

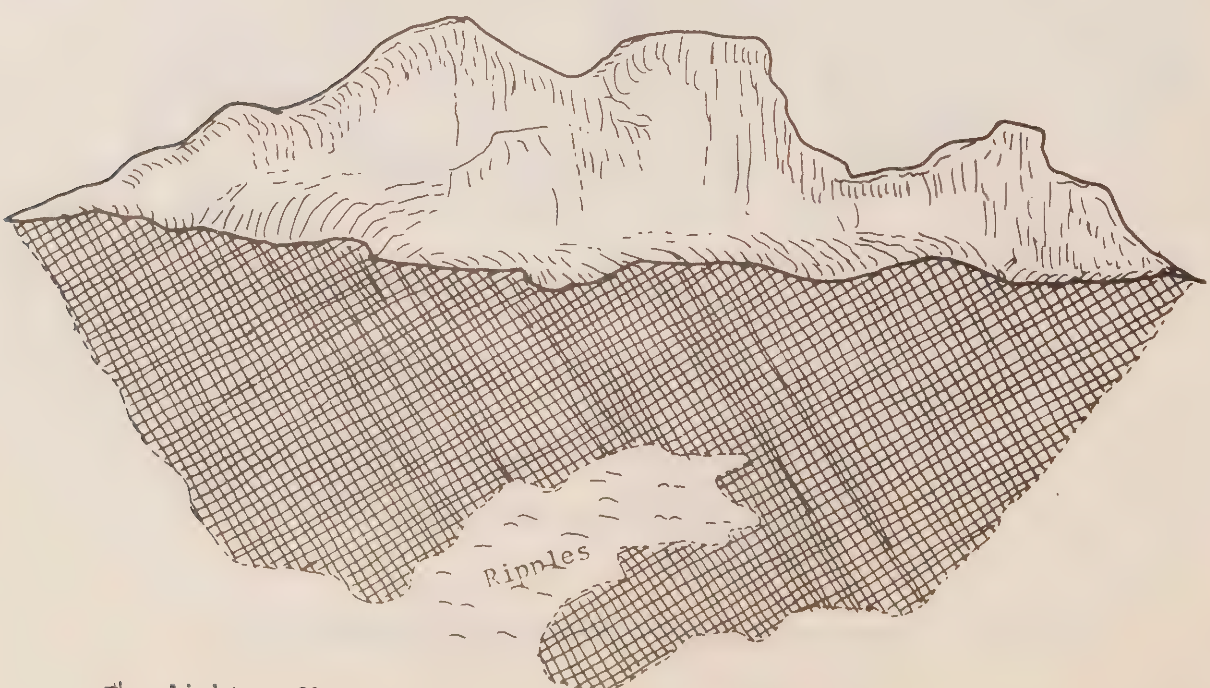
Islands and Shadows



The range of visibility is limited by shadows

FIGURE 17

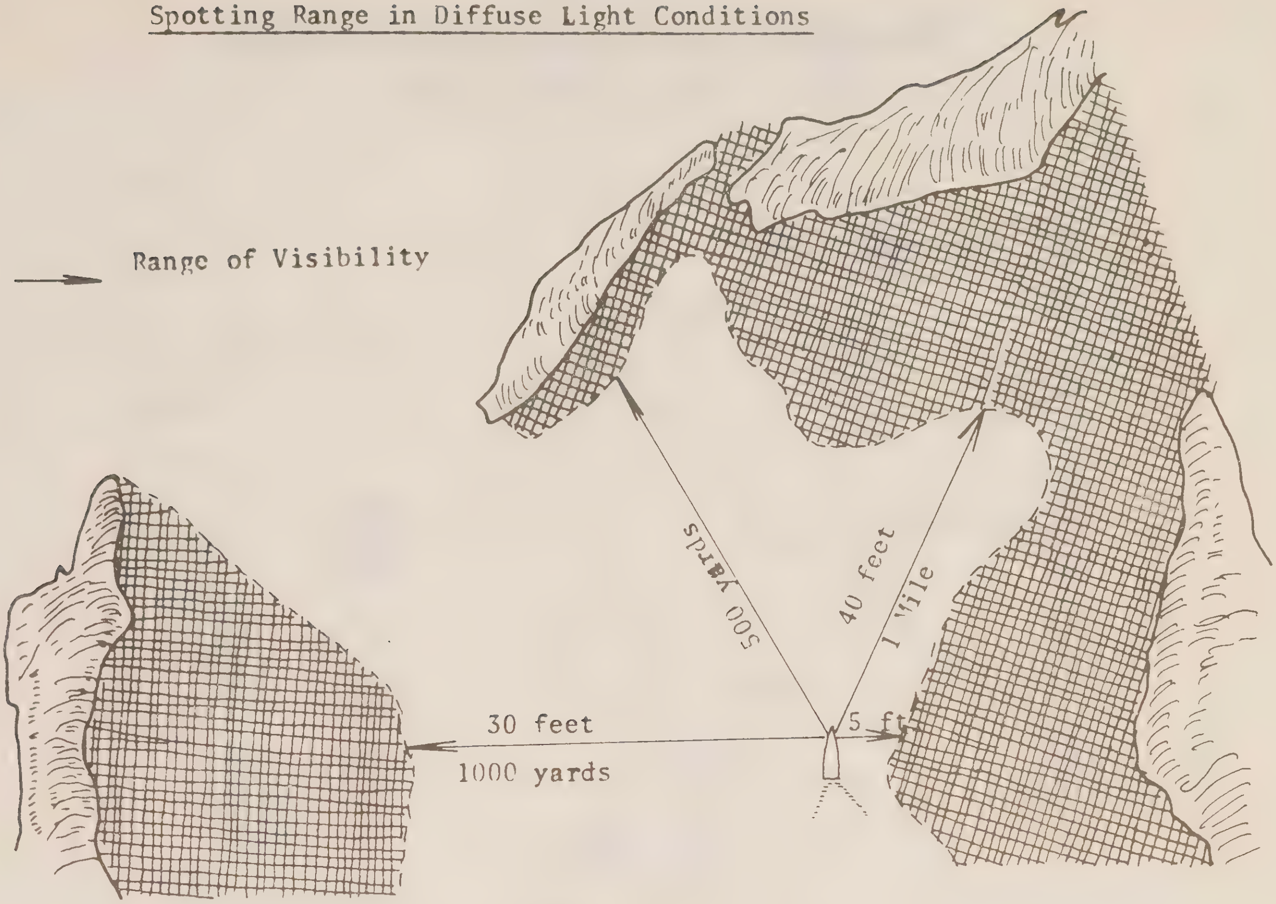
How Winds Aid Visibility



The light reflected from the ripples creates a light coloured area in which a seal's head can be seen.

FIGURE 18

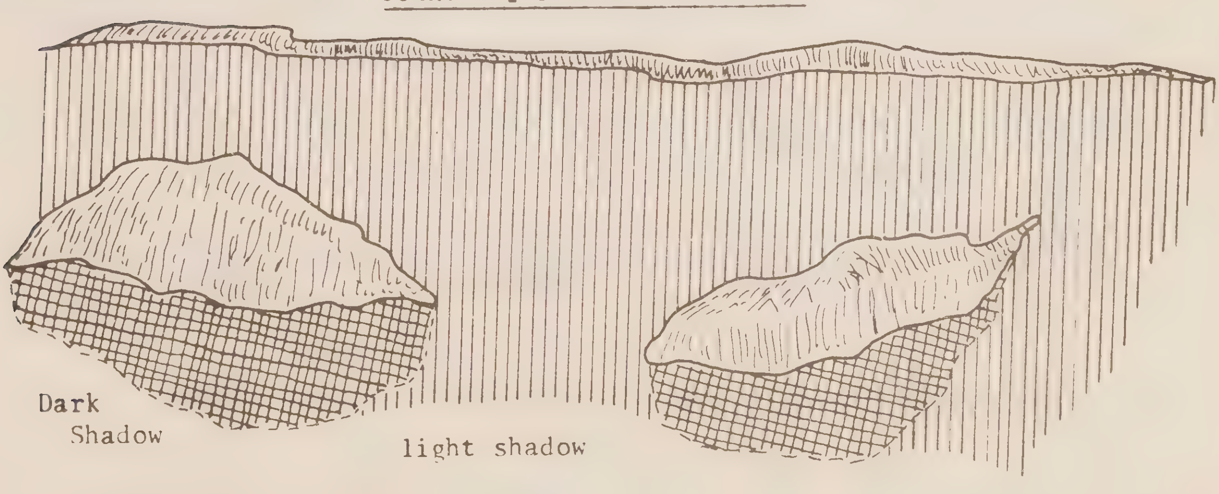
Spotting Range in Diffuse Light Conditions



In Diffuse Light Conditions the Shadows Point Toward Observer

FIGURE 19

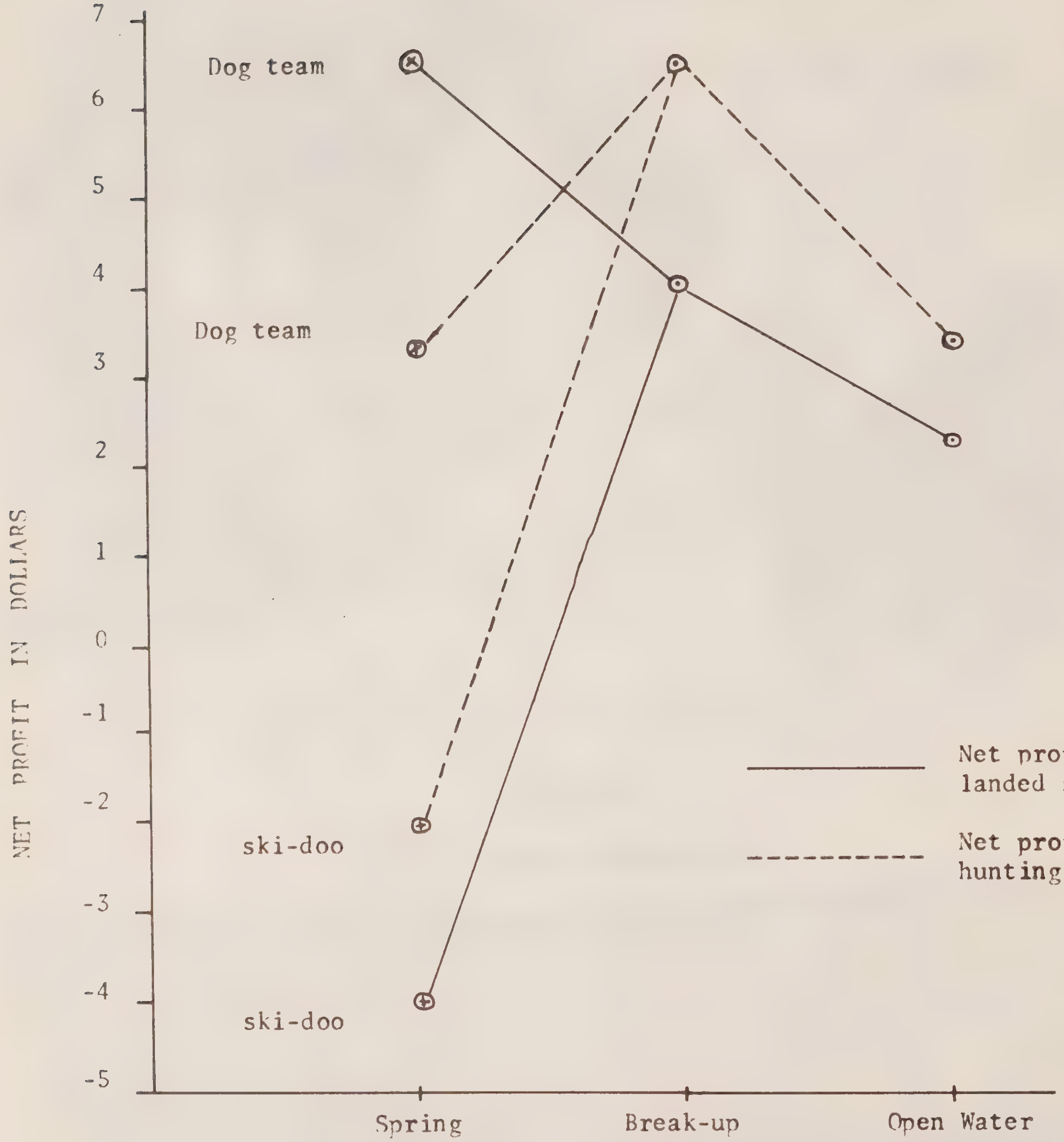
Tonal Variations in Shadows



During twilight the shadows from the distant islands have a lighter hue than the nearby islands, and there is a greater possibility of seeing a seal's head in the lighter shadows.

FIGURE 20

Seasonal Net Hunting Profits, Cumberland Sound



Net profit per hunting day

Spring	Dogs $3.27 Ski-doo - $2.03	Break-up	$6.44	Open Water	$3.40

FIGURE 21

Ringed and Harp Seals Traded, Cumberland Sound

August 1, 1965 to July 31, 1966

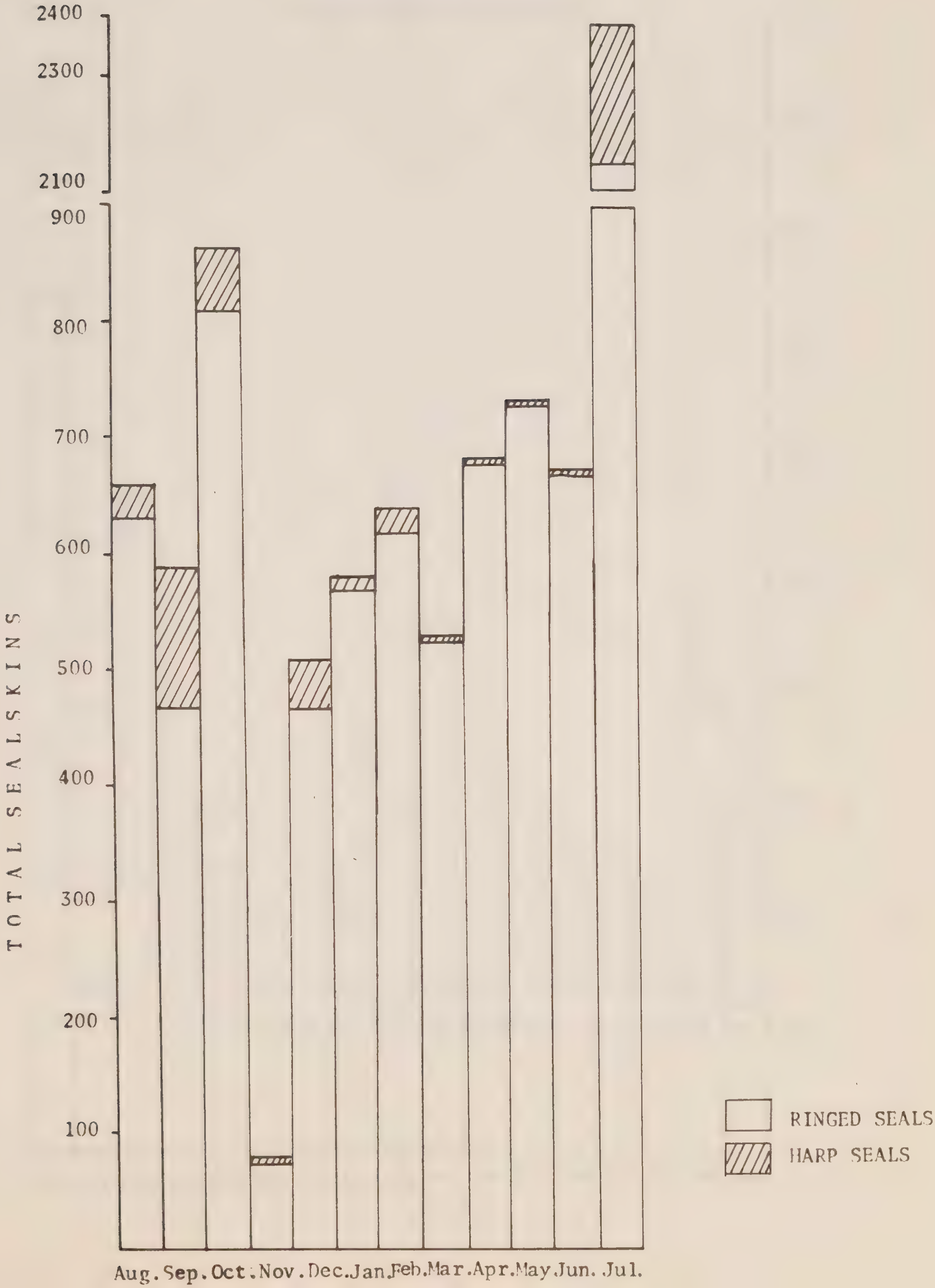


FIGURE 22

Sealskins Traded, Broughton Island

April 1965 to August 1966

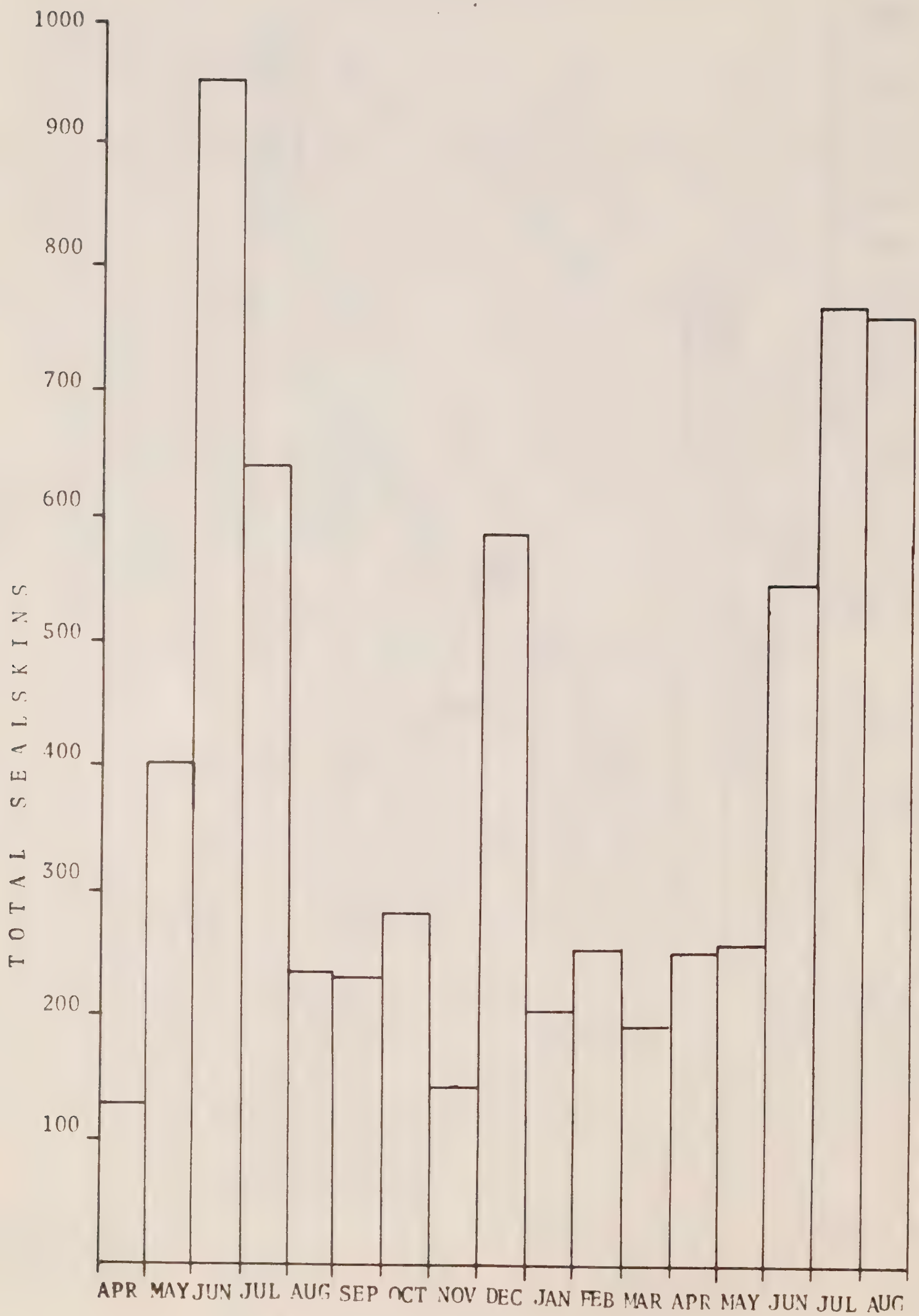


FIGURE 23

Sealskins Traded, Clyde River

January 1965 to May 1966

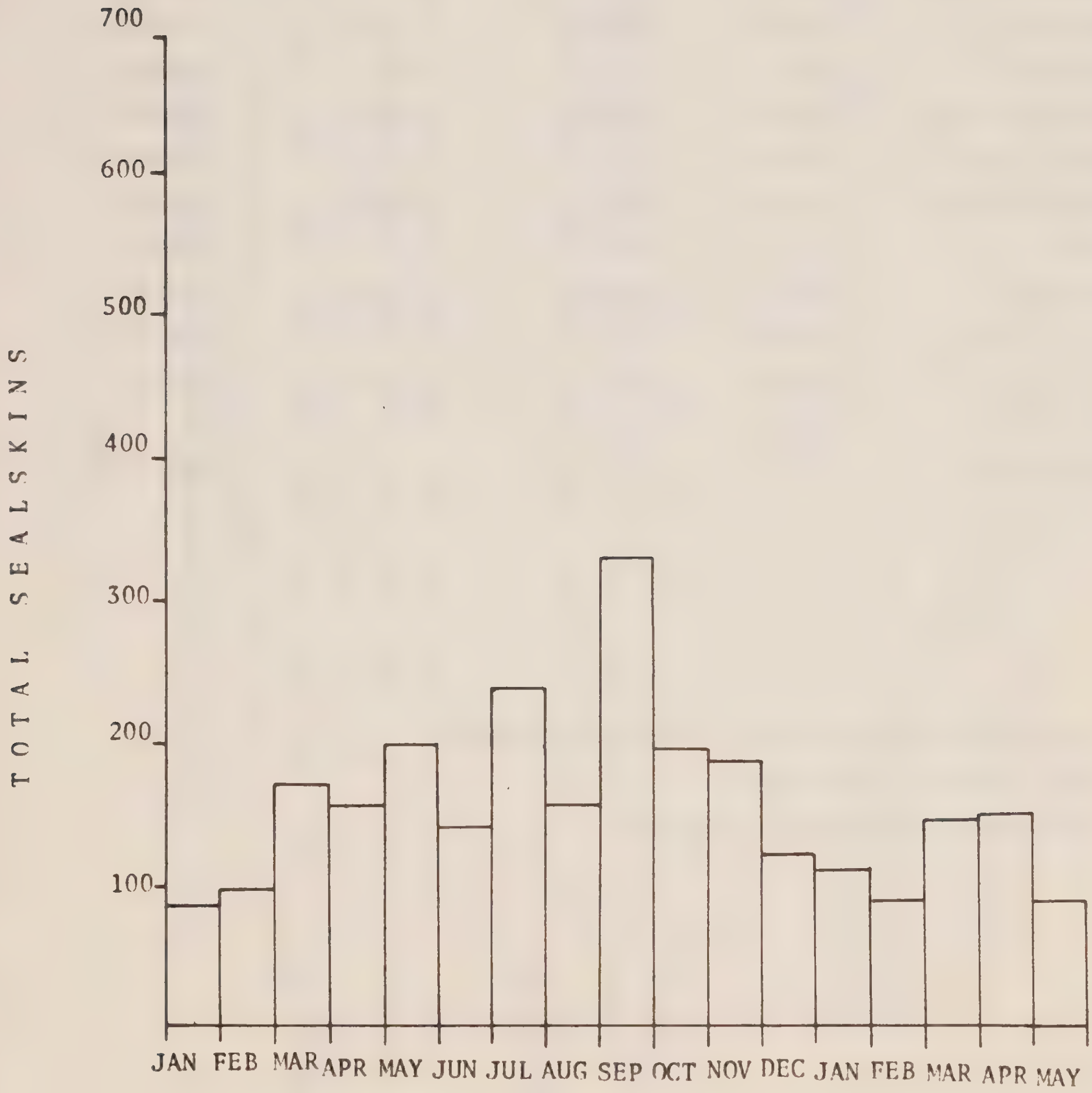


TABLE 1

PRIMARY METEOROLOGICAL STATIONS EASTERN BAFFIN ISLAND[1]

Station Name	Lat, °N	Long, °W	Height (ft.)	Report Period
Brevoort Island	63° 21'	64° 10'	1,222	1961-66
Pangnirtung	66° 09'	65° 30'	43	1930-42*
Cape Dyer	66° 35'	61° 37'	1,207	1960-66
Padloping Island	67° 06'	62° 21'	130	1941-50*
Durban Island	67° 06'	62° 09'	2,180	1960-63*
Broughton Island	67° 33'	64° 03'	1,905	1960-66
Kivitoo	67° 58'	64° 55'	1,450	1959-63*
Cape Hooper	68° 26'	66° 47'	1,316	1960-66
Ekalugad Fjord	68° 43'	68° 33'	2,375	1958-63*
Dewar Lakes (Mid Baffin)	68° 39'	71° 10'	1,700	1960-66
Clyde River	70° 25'	68° 17'	26	1943-66**

1 - As taken from Rae (1951) and CDS No.5/1966.

* - No longer in operation.

** - Department of Transport Station

TABLE 2

ABSORBED SOLAR RADIATION ON EASTERN BAFFIN ISLAND[1]

(Langleys per day)

Longitude 65°W	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Lat. 65°N		19	53	105	153	275	313	291	143	58		
67° 30' N		8	45	97	162	262	311	256	126	44		
70°N		7	37	88	171	248	308	221	108	29		
Longitude 70°W												
Lat. 65°N		20	56	110	155	285	338	294	133	48		
67° 30'N		14	46	100	163	264	320	241	108	34		
70°N		7	36	90	170	242	301	187	83	19		

1. As adapted from Vowinckel and Orvig (1964). These represent average values and should be considered as approximations only.

TABLE 3[o]

DURATION OF DAYLIGHT, TWILIGHT AND THEORETICAL HUNTING LIGHT

	Daylight				Twilight				Hunting Light			
	65°N		75°N		65°N		75°N		65°N		75°N	
Month	hr.	min.	hr.	min.	hr.	min.	hr.	min.	hr.	min.	hr.	min.
Jan	05	15	00	00	01	11	02	48	06	26	02	48
Feb	08	42	07	20	00	53	01	12	09	35	08	32
Mar	11	53	11	35	00	49	01	02	12	42	12	37
Apr	15	25	16	05	01	00	01	22	16	25	17	27
May	18	57	23	00	*		*		**		**	
Jun	21	58	**		*		*		**		**	
Jul	20	02	**		*		*		**		**	
Aug	16	25	18	25	01	07	*		17	32	**	
Sep	12	54	13	25	00	50	01	05	13	44	14	30
Oct	09	33	09	00	00	51	01	04	10	24	10	04
Nov	06	03	03	55	01	04	01	42	07	07	05	37
Dec	03	38	00	00	01	27	02	05	05	05	02	05

o - Adapted from list (1963)
* - Twilight lasts all night
** - 24 hour duration

TABLE 4

AVERAGE CLOUDINESS (DAY PER MONTH)
(taken from Rae - 1951)

Station	Cover	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Pangnirtung	0-20%	17	17	18	16	11	9	10	6	7	11	11	18	
(1938-50)	30-70%	4	5	4	4	4	5	5	8	5	4	5	3	
	80-100%	10	6	9	10	16	16	16	17	18	16	14	10	
Mean Cloudiness (%)		36	28	36	39	58	61	56	64	65	56	55	36	
Clyde River (1940-50)	0-20%	13	12	15	12	7	7	4	4	3	6	8	14	
	30-70%	6	5	5	6	4	5	6	5	3	4	3	4	
	80-100%	12	11	11	12	20	18	21	22	24	21	19	13	
Mean Cloudiness (%)		49	46	44	48	72	67	74	79	84	72	68	46	

PERCENTAGE FREQUENCY OF CLOUDINESS
(taken from CDS No. 3/66)

Station	Cover	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Cape Dyer	0-20%	33	36	51	46	14	22	22	19	12	18	33	35	29
(1960-64)	30-70%	21	21	23	22	19	24	29	26	22	22	19	20	22
	80-100%	46	43	26	32	67	54	49	55	66	60	48	45	49
Mean Cloudiness (%)		56	53	38	46	74	65	63	68	74	69	57	55	60
Clyde River	0-20%	45	48	54	47	23	25	19	15	11	19	34	49	32
(1941-60)	30-70%	14	15	15	18	15	18	21	16	13	14	12	15	16
	80-100%	41	37	31	35	62	57	60	69	76	67	54	36	52
Mean Cloudiness (%)		48	44	37	44	69	66	69	76	82	74	59	44	59

TABLE 5

MONTHLY AND ANNUAL AVERAGES OF DAILY MEAN AIR TEMPERATURE F^o

Station	Obs. Record	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Brevoort Island	1961-64	- 5.5	- 8.8	- 1.2	9.9	20.3	31.7	40.2	39.6	31.0	21.3	12.2	3.7	16.2
Pangnirtung	1930-42	-16.0	-16.0	- 7.0	8.0	25.0	37.0	45.0	44.0	37.0	25.0	11.0	-8.0	15.0
Cape Dyer	1960-64	- 7.4	- 9.8	- 5.3	6.5	19.6	33.2	43.2	40.8	30.1	19.5	7.0	-1.7	14.7
Padloping Island	1941-50	-15.0	-19.0	-12.0	1.0	21.0	35.0	42.0	41.0	34.0	24.0	10.0	-4.0	13.0
Durban Island	1960-63	-10.8	-14.0	- 6.6	5.3	18.4	33.3	43.2	38.6	28.8	18.5	6.7	-2.8	13.2
Broughton Island	1960-64	-11.5	-14.2	- 9.2	3.1	16.4	30.6	41.3	38.5	28.8	17.9	5.2	-3.9	11.9
Kivitoo	1959-63	-13.5	-12.8	- 8.6	2.6	17.4	31.8	42.0	37.7	28.6	17.7	5.5	-5.6	11.9
Mid-Baffin	1960-64	-18.2	-18.6	-13.2	-1.6	15.8	32.8	43.8	39.2	25.5	12.6	0.3	-9.4	9.1
Cape Hooper	1960-64	-13.8	-15.4	-11.2	2.1	15.0	30.9	41.2	36.9	29.0	17.9	4.9	-5.9	11.0
Ekalugad Fjord	1958-63	-16.2	-16.9	-11.4	-0.7	15.5	30.4	40.0	35.6	25.6	14.2	0.6	-8.5	9.0
Clyde River	1943-50	-16.0	-19.0	-13.0	-2.0	19.0	34.0	41.0	40.0	32.0	21.0	4.0	-11.0	11.0

TABLE 6

MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE[1]

Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Brevoort Island	Max	1	1	- 1	16	25	36	46	44	35	25	17	9	21
	Min	-12	-10	-12	4	15	27	34	35	27	17	8	- 2	11
Pangnirtung	Max	- 9	- 9	2	17	32	42	52	49	42	30	16	- 2	22
	Min	-23	-24	-15	- 1	18	31	39	39	32	20	- 6	-15	9
Cape Dyer	Max	1	1	- 2	15	25	38	49	46	35	25	14	7	21
	Min	-14	-14	-19	- 2	14	28	37	35	25	14	0	- 9	8
Padloping Island	Max	- 9	-14	- 5	8	28	41	49	47	39	28	15	0	19
	Min	-20	-24	-18	- 6	15	30	35	35	30	20	6	- 9	7
Durban Island	Max	- 7	- 4	- 3	12	22	38	50	43	32	24	11	3	19
	Min	-15	-14	-14	-17	9	27	40	33	24	17	4	- 6	9
Broughton Island	Max	- 5	- 5	- 7	9	21	35	47	43	31	21	10	2	17
	Min	-18	-17	-19	- 3	10	26	36	33	24	14	0	-10	6
Kivitoo	Max	- 9	- 5	- 6	8	20	36	50	42	32	20	8	0	16
	Min	-18	-14	-16	- 3	11	27	38	33	25	13	2	- 8	7
Cape Hooper	Max	- 9	- 8	-11	7	20	35	47	41	31	21	9	- 1	15
	Min	-19	-17	-20	- 3	10	27	36	33	25	15	1	-11	6
Ekalugad	Max	- 7	-10	- 7	6	19	33	45	38	28	16	2	- 4	13
	Min	-18	-21	-19	- 6	8	24	34	31	21	9	- 7	-13	4
Mid-Baffin	Max	-12	- 9	-13	5	19	36	50	44	29	17	6	- 3	14
	Min	-24	-22	-25	- 7	9	27	38	34	22	8	- 6	-15	3
Clyde River	Max	-10	-12	- 5	5	27	40	48	46	36	27	11	- 5	17
	Min	-23	-26	-22	-10	12	28	33	33	28	15	- 2	-18	4

1 - As taken from Rae (1951) and CDS No./66

TABLE 7

WIND DIRECTION FOR SELECTED MONTHS*

Station	Observation Period	Month	Percentage Observations - Wind Direction N	NE	E	SE	S	SW	W	NW	Calm
Brevoort Island	1960-65	Jul	22.5	27.5	3.0	6.4	3.0	3.0	2.6	4.3	27.7
(data	1960-65	Oct	22.6	24.0	7.9	3.5	3.7	5.6	6.8	13.5	12.3
missing	1961-66	Jan	20.2	20.3	4.1	2.3	2.5	5.4	5.0	9.1	31.2
1963-64)	1961-66	Apr	19.7	19.3	2.7	2.9	6.7	2.7	2.1	3.1	41.0
Cape Dyer	1958-65	Jul	8.7	7.1	6.0	6.1	10.2	16.0	19.2	7.8	19.2
	1959-65	Oct	9.2	9.1	9.1	4.8	6.4	5.5	25.7	14.7	15.6
	1959-66	Jan	5.4	13.6	9.4	9.3	8.1	7.2	14.6	12.7	19.6
	1959-66	Apr	6.4	12.8	9.6	5.4	7.3	7.1	14.4	14.8	22.8
Padloping Island	1948-51	Jul	17.6	3.8	3.9	6.6	9.1	2.7	3.8	16.0	12.0
	1948-51	Oct	25.2	5.9	4.0	3.6	5.5	5.5	8.5	11.5	12.3
	1948-51	Jan	19.4	0.9	1.6	0.1	0.4	0.4	1.5	42.4	16.0
	1948-51	Apr	15.2	5.1	4.4	2.4	2.8	1.5	2.6	24.2	21.1
Broughton Island	1960-65	Jul	14.9	2.6	2.9	7.3	5.8	1.8	7.3	14.2	43.4
	1960-65	Oct	9.0	3.1	5.3	8.0	4.1	4.9	11.6	18.7	35.2
	1961-66	Jan	9.4	2.4	5.7	5.7	7.5	4.5	8.3	18.8	36.9
	1960-66	Apr	16.0	1.4	1.3	8.0	6.2	1.2	4.0	20.2	41.0
Mid-Baffin	1958-65	Jul	3.8	7.1	32.2	8.8	11.2	13.6	10.6	7.2	5.8
	1959-66	Jan	5.5	17.5	26.1	8.7	11.0	7.0	7.1	2.9	13.2
Cape Hooper	1958-66	Apr	11.5	10.9	6.1	7.2	2.4	7.4	20.3	5.3	28.9
	1958-65	Jul	8.4	7.3	7.7	14.5	5.8	9.3	14.6	10.0	22.4
	1959-65	Oct	13.8	12.3	9.6	9.0	4.4	10.0	24.0	8.2	8.7
	1958-66	Jan	9.1	11.4	7.4	6.6	2.6	7.6	22.1	9.0	24.4
Clyde River	1954-65	Jul	15.6	7.8	7.1	2.5	9.9	9.3	4.7	18.0	25.8
	1958-66	Jan	15.1	5.7	6.8	5.2	5.6	4.3	3.6	15.6	38.1

* Adapted from Coulcher (1967)

TABLE 8

WIND SPEEDS FOR SELECTED MONTHS*

Station	Observation Period	Month	Percentage Observations Calm	1-12 mph	13-38 mph	over 39 mph
Brevoort Island	1960-65	Jul	27.7	46.4	25.5	0.4
	1960-65	Oct	12.3	43.8	43.6	0.3
	1961-66	Jan	29.4	32.0	32.8	4.0
	1961-66	Apr	41.0	31.2	25.3	2.5
Cape Dyer	1958-65	Jul	19.2	58.2	22.1	0.5
	1959-65	Oct	15.6	46.2	36.2	2.0
	1959-66	Jan	19.6	36.7	35.8	7.9
	1959-66	Apr	22.4	49.8	25.6	2.2
Broughton Island	1960-65	Jul	43.4	50.8	5.8	-
	1960-65	Oct	35.2	48.4	16.2	0.2
	1961-66	Jan	36.9	31.6	30.6	0.9
	1960-66	Apr	41.0	46.7	12.3	-
Mid-Baffin	1958-65	Jul	5.8	48.1	45.2	0.9
	1959-66	Jan	13.2	50.1	32.5	4.2
Cape Hooper	1958-65	Jul	22.4	57.7	18.8	1.1
	1959-65	Oct	8.7	44.4	42.5	4.4
	1958-66	Jan	24.4	37.6	32.0	6.0
	1958-66	Apr	28.9	45.0	22.4	3.7
Clyde River	1954-65	Jul	25.8	63.0	11.1	0.1
	1958-66	Jan	37.1	48.4	13.5	1.0

* Adapted from Coulcher (1967).

TABLE 9

MEAN MONTHLY PRECIPITATION IN INCHES

Station	Ppt. Type	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Brevoort Island														
	Rain	0.00	0.01	0.00	0.00	0.03	0.16	1.49	3.25	1.79	0.01	0.13	0.00	6.87
	Snow	12.2	13.7	6.5	5.1	13.4	7.0	2.6	T	11.4	18.2	7.9	15.9	113.9
	Total	1.22	1.38	0.65	0.51	1.37	0.86	1.75	3.25	2.93	1.83	0.92	1.59	18.26
Pangnirtung														
	Rain	0.01	0.00	0.04	0.04	0.27	0.76	1.39	2.14	1.04	0.41	0.01	0.00	6.11
	Snow	9.9	12.4	9.4	15.1	4.3	1.9	T	T	2.0	14.2	19.3	12.2	100.7
	Total	1.00	1.24	0.98	1.55	0.70	0.95	1.39	2.14	1.24	1.83	1.94	1.22	16.18
Cape Dyer	Rain	0.01	0.01	T	T	T	0.47	0.89	2.79	1.01	0.03	0.15	T	5.36
	Snow	25.5	21.4	11.1	10.0	19.7	10.6	1.6	2.5	22.7	32.1	20.1	38.5	215.8
	Total	2.56	2.12	1.11	0.98	2.02	1.61	1.06	3.05	3.28	3.01	1.99	3.61	26.40
Padloping Island														
	Rain	0.1	0.1	0.0	0.0	0.1	0.4	1.1	0.4	0.5	0.1	0.0	0.0	2.4
	Snow	7.0	7.0	3.0	2.0	7.0	5.0	1.0	3.0	6.0	14.0	14.0	6.0	75.0
	Total	0.7	0.7	0.3	0.2	0.7	0.9	1.2	0.7	1.1	1.4	1.4	0.6	9.9
Broughton Island														
	Rain	0.00	0.00	0.00	0.00	T	T	0.33	0.88	0.10	T	0.00	0.00	1.32
	Snow	6.2	3.6	1.9	4.0	9.0	10.2	1.1	2.1	12.7	29.6	13.4	10.4	104.2
	Total	0.62	0.36	0.19	0.40	0.90	1.02	0.44	1.09	1.37	2.96	1.34	1.04	11.74
Ekalugad Fjord														
	Rain	0.01	0.00	0.00	0.00	0.00	0.01	1.14	0.29	0.31	0.00	0.00	0.00	1.76
	Snow	2.7	2.5	0.6	3.7	4.3	4.3	0.3	4.5	9.2	13.2	7.2	0.5	53.0
	Total	0.28	0.25	0.06	0.37	0.43	0.44	1.17	0.74	1.23	1.32	0.72	0.05	7.06
Mid-Baffin	Rain	0.00	0.00	0.00	0.00	T	0.04	1.07	2.12	0.68	0.00	0.00	0.00	3.91
	Snow	2.2	1.6	1.1	2.8	7.2	4.4	2.4	2.3	9.9	6.2	3.7	2.6	46.4
	Total	0.22	0.16	0.11	0.28	0.72	0.48	1.31	2.35	1.67	0.62	0.37	0.26	8.55
Cape Hooper	Rain	0.00	0.00	0.00	0.00	0.00	T	0.31	0.91	0.53	0.02	0.00	0.00	1.77
	Snow	1.4	7.2	2.0	5.0	10.9	4.8	1.1	2.0	8.1	12.1	5.7	4.1	64.4
	Total	0.14	0.72	0.20	0.50	1.09	0.48	0.42	1.11	1.34	1.23	0.57	0.41	8.21
Clyde River	Rain	0.00	0.00	0.00	0.00	0.01	0.06	0.82	1.12	0.26	0.00	0.00	0.00	2.27
	Snow	3.5	3.3	2.4	2.4	4.3	3.1	1.2	0.5	6.0	12.9	11.3	2.1	43.0
	Total	0.35	0.33	0.24	0.24	0.44	0.37	0.94	1.17	0.86	1.29	1.13	0.21	6.57

T = Trace

TABLE 10

Station: Pangnirtung
Latitude: 66° 09'N

Longitude: 65° 30'W
Height above mean sea level: 43 ft.

Years: November, 1925-July, 1950 (broken)

Month	(°F) at Station Level								Mean Monthly Precipitation (inches)					
	Mean Daily	Mean Daily			Mean Monthly		Absolute							
		Maximum	Minimum	Range	Maximum	Minimum	Maximum	Minimum	Precip.	Rainfall	Snowfall	Precip. Days	Rain Days	Snow Days
January	-16	- 9	-23	14	25	-38	..	...	0.8	0	8	4	0	4
February	-16	- 8	-24	16	21	-41	..	...	0.5	0	5	3	0	3
March	- 8	- 2	-15	13	28	-34	..	...	0.8	0	8	6	0	6
April	9	18	0	18	36	-20	..	...	0.9	0.1	9	6	1	5
May	26	33	18	15	48	1	..	...	0.7	0.2	5	4	2	3
June	37	43	31	12	56	24	..	...	1.0	0.8	2	5	5	2
July	46	52	39	13	63	33	..	...	1.5	1.5	<1	8	7	1
August	44	49	39	10	69	20	..	...	2.3	2.3	<1	8	8	1
September	37	42	32	10	58	22	..	...	1.2	1.0	2	8	6	4
October	24	30	19	11	45	6	..	...	1.6	0.4	12	7	<1	7
November	12	17	6	11	38	-14	..	...	1.1	<0.1	11	4	<1	4
December	- 6	0	-13	13	28	-32	..	...	0.8	0	8	3	0	3
Annual	16	22	9	13	43	6	70	-52	13.2	6.2	70	66	29	43
Years of observation	10-13				7-13				9-12				1-8	

Taken from Rand, p.94, 1963

TABLE 11

Nutrient Values of Selected Animals & Plants

BOWHEAD WHALE (GREENLAND WHALE) - (*Balaena mysticetus*) (Linnaeus)

Average Live Weight: 60,000 lbs. (27,240 kg)

Body Part	% total weight	kgs	% fat	% protein	% carbohy.	10^4K Cal.
Blubber	40	10,896	100.0	-	-	8,716.8
Meat	17	4,631	0.7	23.6	-	463.1
Skin (muktuk)	17	4,631	1.2	12.3	18.2	609.4
Viscera	12	3,269	-	23.0	-	300.7
Blood	ND					
Bones	14					

Total Calories	10^4K Cal.
Meat and Viscera	763.8
Skin (muktuk)	609.4
Blubber	8,716.8
TOTAL	10,090.0

WHITE WHALE (BELUGA) - (*Delphinapterus leucas*) (Pallas)

Average Live Weight: 1,000 lbs. (454 kg)

Body Part	% total weight	kgs	% fat	% protein	% carbohy.	10^4K Cal.
Blubber	25	113.5	100.0	-	-	90.8
Meat	17	77.2	-	24.0	-	7.4
Skin (muktuk)	17	77.2	1.2	12.0	18.0	10.0
Viscera	23	104.4	-	24.0	-	10.0
Blood	ND					
Bones	17	77.2				

Total Calories	10^4K Cal.
Meat and viscera	17.4
Muktuk	10.0
Blubber	90.8
TOTAL	118.2

Nutrient Values of Selected Animals & Plants (cont'd)

POLAR BEAR - (Thalarctos maritimus maritimus) (Phipps)

Average Live Weight: 800 lbs. (363.6 kg)

Body Part	% total weight	kgs	% fat	% protein	% carbohy.	10^4K Cal.
Blubber	37	134.5	100.0	-	-	107.6
Meat*	38	138.2	3.1	25.6	-	17.7
Viscera	3	10.9	3.1	25.6	-	1.4
Blood	ND					
Bones	15					
Skin	7					

Total Calories	10^4K Cal.
Meat and viscera	19.1
Blubber	107.6
TOTAL	126.7

* Includes weight of heart & lungs

WALRUS (Obodenus rosmarus divergens) (Illiger)

Average Live Weight: 1,500 lbs. (682 kg)

Body Part	% total weight	kgs	% fat	% protein	% carbohy.	10^4K Cal.
Blubber	16	109.1	100	-	-	87.3
Meat	35	238.7	8	20.0	-	34.4
Viscera	26	177.3	8	20.0	-	25.5
Blood	ND					
Bone	11					
Skin	12					

Total Calories	10^4K Cal.
Meat and viscera	59.9
Blubber	87.3
TOTAL	147.2

BEARDED SEAL - (Erignathus barbatus nauticus) (Pallas)

Average Live Weight: 600 lbs. (273)

Body Part	% total weight	kgs	% fat	% protein	% carbohy.	10^4K Cal.
Blubber	27	73.1	100.0	-	-	58.5
Meat	25	68.3	0.4	26.7	-	7.3
Viscera	9	24.6	-	26.7	-	2.6
Blood	5					
Bones	16					
Skin	18					

Total Calories	10^4K Cal.
Meat & viscera	9.9
Blubber	58.5
TOTAL	68.4

Nutrient Values of Selected Animals & Plants (cont'd)

HARP SEAL - (Phoca groenlandica)

Average Live Weight: 300 lbs. (135.4 kg)

Body Part	% Total Weight	Kgs	% fat	% protein	% carbohy.	10^4K cal.
Blubber	32	43.6	100.0	-	-	34.9
Meat	27	36.8	1.8	30.0	-	4.9
Viscera	9	12.3	-	30.0	-	1.5
Blood	5	6.8				
Bones	16	21.8				
Skin	11	15.0				

Total Calories	10^4 K Cal.
Meat and Viscera	6.4
Blubber	34.9
TOTAL	41.3

RINGED SEAL - (Phoca hispida beaufortiana) (Anderson)

Average Live Weight: 100 lbs. (45.5 kg)

Body Part	% total Weight	Kgs	% fat	% protein	% carbohy.	10^4K Cal.
Blubber	32	14.6	100.0	-	-	11.7
Meat	27	12.3	1.8	32.4	-	1.8
Viscera	9	4.1	-	32.0	-	0.5
Blood	5					
Bones	16					
Skin	11					

Total Calories	10^4K Cal.
Meat and viscera	2.3
Blubber	11.7
TOTAL	14.0

CARIBOU - (Rangifer acticus stonei) (J.A. Allen)

Average Live Weight: 150 lbs. (68.2 kg)

Body Part	% Total weight	kgs	% fat	% protein	% carbohy.	10^4K Cal.
Fat	10	6.8	100.0	-	-	5.4
Meat	35	23.9	1.1	27.0	-	2.8
Viscera	20	13.6	-	27.0	-	1.5
Blood	ND					
Bone	25					
Skin	ND					

Total Calories	10^4K Cal.
Meat and viscera	4.3
Fat	5.4
TOTAL	9.7

Nutrient Values of Selected Animals & Plants (cont'd)

VARYING HARE (SNOWSHOE RABBIT) - (*Lepus americanus*) (Erxleben)

Average Live Weight: 3.0 lbs. (1.46 kg)

	kg.	% fat	% protein	% carbohy.	Total K Cal.
Usable parts	0.68	?	c. 15.0	?	408.0

ARCTIC GROUND SQUIRREL - (*Spermophilus undulatus kennicotti*) (Ross)

Average Live Weight: 1.7 lbs. (0.8 kg)

	kg.	% fat	% protein	% carbohy.	Total K Cal.
Usable parts	0.454	-	22.0	-	400.00

THICK-BILLED MURRE - (*Uria Lomvia*) (Linnaeus)

Average Live Weight: 2.1 lbs. (0.964 kg)

	kg	% fat	% protein	% carbohy.	Total K Cal.
Usable parts	c. 0.67	2.5	5.3	32.2	1,100

MURRE EGG

Average Weight: 0.104 kg

	kg	% fat	% protein	% carbohy.	Total K Cal.
Usable parts	0.1	?	?	?	c. 160.

WILLOW PTARMIGAN - (*Lagopus Lagopus*)

Average Live Weight: 2.0 lbs. (0.9 kg)

	kg	% fat	% protein	% carbohy.	Total K Cal.
Usable parts	0.630	1.4	25.7	-	718.0

Nutrient Values of Selected Animals & Plants (Cont'd)

COMMON EIDER - (*Somateria mollissima*)

Average Live Weight: 3.5 lbs. (1.6 kg)

	kg	% fat	% protein	% carbohy	Total K Cal.
Usable parts	1.1	1.1	12.3	17.2	1,394.8

SOURDOCK

	kg	% fat	% protein	% carbohy.	Total K Cal.
Usable parts	0.454	0.3	3.7	10.2	263.6

BLUEBERRIES

	kg	% fat	% protein	% carbohy.	Total K Cal.
Usable parts	0.454	-	1.0	13.2	272.4

WILLOW LEAVES

	kg	% fat	% protein	% carbohy.	Total K Cal.
Usable parts	0.454	1.2	3.7	28.0	618.8

POLAR COD (TOM COD) - (*Boreogadus saida*) (Lepechin)

	kg	% fat	% protein	% carbohy.	Total K Cal.
Usable parts	0.454	3.0	20.0	-	472.0

GRAYLING - (*Thymallus arcticus signifer*) (Richardson)

	kg	% fat	% protein	% carbohy	Total K Cal.
Usable parts	0.454	1.6	23.4	-	476.0

TABLE 12

AVERAGE CALORIC CONTENT OF SOME ANIMALS AND PLANTS USED BY ESKIMOS

Species	10^4 K Cal. from fat	10^4 K Cal from protein and carbohydrate	Total 10^4 K Cal
Marine Mammals			
Bowhead whale	8,716.8	1,373.2	10,090.0
Walrus	87.3	59.9	147.2
Polar bear	107.6	19.1	126.7
White whale	90.8	27.4	118.2
Bearded seal	58.5	9.9	68.4
Harbour seal	23.3	4.3	27.6
Ringed seal	11.7	2.3	14.0
Harp seal	34.9	6.4	41.3
Land Mammals			
Grizzly bear	27.2	12.8	40.0
Caribou	5.4	4.3	9.7
Dall sheep	?	4.0	4.0+
Hoary marmot	?	c. 0.2	c. 0.2+
Varying hare	?	c. 0.04	c. 0.04
Arctic ground squirrel	?	0.04	0.04
Birds			Total Calories
Common eider			1,395.0
Thick-billed murre			1,100.0
Willow ptarmigan			718.0
Murre egg			c. 160.0

Species	Total Kilo Calories Per Pound
Fishes	
Whitefish (several species)	515.6
Grayling	476.0
Trout (several species)	497.6
Polar cod	472.0
Salmon (several species)	453.6
Northern pike	346.8
Arctic char	454.0
Plants	
Willow leaves	618.8
Blueberries	272.4
Sourdock	263.6

TABLE 13

WEIGHT AND AREA OF DRY UNTANNED ANIMAL SKINS

Species	Dry weight (grams)	Area (cm^2)	Area (cm^2) per gram weight
Black bear	3,400	14,000	4.118
Caribou (fall)	1,600	13,000	8.125
Caribou (summer)	2,400	17,750	7.396
Bearded seal	3,200	25,500	7.969
Harp seal	1,400	16,625	11.875
Ringed seal	400-620	4750-6,720	10.645-12.577

All skins except the caribou have been lightly scraped

TABLE 14

NUMBER OF RINGED SEALS TRADED AT PANGNIRTUNG, 1962 - 1965[1]

	1962			1963			1964			1965		
	No. of Silver Jars	Common Jars	Total	No. of Silver Jars	Common Jars	Total	No. of Silver Jars	Common Jars	Total	No. of Silver Jars	Common Jars	Total
Jan.	165	320	485	19	72	91	340	413	753	408	671	1079
Feb.	104	387	391	178	404	582	119	276	395	333	468	801
Mar.	159	405	564	134	338	472	142	406	548	258	420	678
April	35	163	198	128	473	601	176	506	682	399	563	962
May	36	247	283	173	750	923	146	549	695	Break-down into		1164
June	182	425	607	432	440	872	321	944	1265	silver and		2410
July	540	286	826	1544	826	2370	1136	1716	2852	common jar		2795
Aug.	247	496	743	391	406	797	381	738	1119	discontinued.		630
Sept.	103	330	433	179	408	587	199	533	732			470
Oct.	290	808	1098	222	688	910	276	1096	1372			810
Nov.	53	181	234	19	89	108	28	142	170			76
Dec.	127	342	469	166	324	490	265	493	758			467
TOTAL	2041	4290	6331	3585	5218	8803	3529	7812	11341			12342

1 These figures were calculated from data obtained from the Traders Fur Record Book.

TABLE 15

Sealskins collected from Cumberland Sound by the vessel Alert

DATE	NUMBER OF SKINS
1885	over 5000
1888	3300
1892	8613
1895	4500
1899	2900
1900	3048
1901	3420

Taken from Lubbock, 1937

TABLE 16

Sealskins traded into H.B.C. at Pangnirtung, 1958-1963

DATE	NUMBER OF SKINS
1958-59	3164
1959-60	4719
1960-61	6499
1961-62	4522
1962-63	7433

Taken from R.C.M.P. Game Reports

TABLE 17

SEASONAL SEAL LOSSES DUE TO SINKING

Spring Fast Ice Hunting

May 21 - June 11

Ringed seal

31 killed 3 sank

9.7% loss

Break-up Hunting

June 12 - June 28

Ringed seal				Harp seal	
103 killed	16 sank	(14 killed	3 sank+)	9 killed	6 sank
15.5% loss*		21.5% loss		66.7% loss	

July 2 - July 11

Ringed seal				Harp seal	
121 killed	21 sank	(4 killed	1 sank+)	37 killed	24 sank
17.4% loss*		25% loss		64.9% loss	

Open Water Hunting

July 12 - July 31

Ringed seal		Harp seal	
326 killed	92 sank	34 killed	17 sank
28.2% loss		50% loss	

August 1 - August 31

Ringed seal		Harp seal	
113 killed	18 sank	38 killed	14 sank
15.9% loss		36.8% loss	
Total ringed seal sample		Total harp seal sample	
694 killed	150 sank	118 killed	61 sank
21.6% loss		51.7% loss	

*Percentage of seals killed on ice is unknown.

+All seals killed in water

TABLE 18

NUMBERS OF HARP SEALS TRADED INTO PANGNIRTUNG

1965-66

MONTH	YEAR	NUMBER TRADED
June	1965	11
July	1965	85
Aug.	1965	31
Sept.	1965	118
Oct.	1965	55
Nov.	1965	3
Dec.	1965	42
Jan.	1966	9
Feb.	1966	10
Mar.	1966	4
April	1966	5
May	1966	1
June	1966	5
July	1966	243

TABLE 19

NUMBER OF HARP AND RINGED SEALS OBSERVED ON RANDOM HUNTS

Date	No. Ringed Seals Seen	No. Harp Seals Seen	Area where census taken
June 10	3	0	3 miles from mouth of Kingnait Fjord
11	5	3	near Oomuna
12	1	1	mouth of Pangnirtung Fjord
14	11	6	Pangnirtung Fjord to Oomuna
15	2	19	5 mi. from Kingnait Fjord
16	9	29	5-10 mi. off Peroeektok
17	11	7	5 mi. off Awkpalukto
25	18	16	3 mi. off Nasauya
July 9	7	23	from Pangnirtung Fjord to Irvine Inlet
11	13	36	from Kingmiksoo to mid Cumberland Sound
13	6	10	from Krepishaw to mid Cumberland Sound
14	17	0	Akuna to Kungertikalukjuak
20	16	0	Littlecoat Channel to Cape Edwards
Aug. 22	7	4	Kingmiksoo
23	14	9	Chidliak Bay
24	4	21	Krepishaw to Nuvuyen
25	5	1	Kingmiksoo to Ikpit
TOTAL	148	185	

Ratio of harp to ringed seals = 1.25:1.00

TABLE 20

R.C.M.P. GAME REPORTS FOR PANGNIRTUNG, N.W.T., 1962-66[1]

Year	Fox		Polar	Walrus	Narwhal	Caribou
	White	Cross	Bear			
1962-63	4	-	15	1	33	425
1963-64	46	-	8	-	-	450
1964-65	691	-	15	11	-	1,200
1965-66	65	2	21	22	11	600

1 Reporting period from June 30th

TABLE 21

PRINCIPAL TRADE AND DEFENSE SITES OF EASTERN BAFFIN ISLAND 1920-1966.

Location	Founding Date	Remarks
Blacklead Island	mid-1880's H.B.C. 1921 Mission 1894	now abandoned
Pangnirtung	H.B.C. 1921 R.C.M.P. 1923 Mission 1928 Hospital 1930- School 1960-65	
Keketern Island	H.B.C. 1921	now abandoned
Sirmilling Bay	H.B.C. c. 1921	now closed
Kangertukjuk Fjord	H.B.C. c. 1923	now closed
Clyde River	H.B.C. 1923 U.S. Army 1942 D.O.T. c. 1950 Mission 1961 School 1960	
Cape Christian	U.S.C.G. 1954 R.C.M.P. 1954	
Dewar Lake	1956-57	
Ekalugad Fjord	1956-57	now closed
Cape Hooper	1956-57	
Kivitoo	1956-57	now closed
Broughton Island	1956-57 H.B.C. 1960 Mission c. 1962 School 1960	
Padloping Island	U.S. Army 1942 D.O.T. c. 1950 School 1961	now closed
Durban Island	1956-57	now closed
Cape Dyer	1956-57	

TABLE 22

ESKIMO POPULATION OF CUMBERLAND SOUND 1944-1966[1]

Place Name	1944	1951	1961	1966
Abraham Bay		13		
Avatuktoo	20	23	44	
Bon Accord	66	56	66	46
Cape Mercy		23		
Iglootalik	19	16	30	13
Ikalloolik	40	31	41	20
Imigen	39	46	40	42
Keberten Island		26		
Kee Mee				25
Kingmiksoon	48	9	42	50
Kingnait	31	4		
Kreepeeshaw	33	37	46	35
Noonata	39	31	38	
Nowyaklik	19	11	28	
Olitivik (Opernavik)	21	12		
Pangnirtung	45	75	96	342
Sukpeeweesuktoo			32	
Tesseralik		16		
Tuakjuak	20		25	
Twapine			31	30
Ushualuk	14	32		
TOTAL	454	461	559	603

1 Taken from Dominion Bureau of Statistics and R.C.M.P. Reports.

TABLE 23

ESKIMO POPULATION OF THE EAST COAST 1951-1966

Place Name	Population 1944	1951	1961	1964	1966
Ailaktali				13	20
Akoleearkatak				22	28
Broughton Island		23	70	149	200
Cape Christian			10		
Cape Dyer			31		
Cape Hewett			24		
Cape Hooper			15		
Clyde Inlet			6		
Clyde River		128*	32	107	91
Eglinton Fjord			25		
Ekalugad Fjord			8		
Home Bay			14		
Inugsuin Fjord			16		
Kivitoo	27		22		
Naksalokluk				22	23
Nolooetet				9	15
North Pangnirtung Fjord	21	29			
Padloping Island		75	43		56
Padle Fjord		3			
Pinera				16	16
Pinjwasook				10	25
Sam Ford Fjord			12		
Supegayaktu				16	16
Tekinait				31	22
Total	48	258	328	395	512

[1] Taken from Dominion Bureau of Statistics and R.C.M.P. Reports.

* Total area population.

TABLE 24

POPULATION OF CLYDE RIVER AREA, KIVITOO, BROUGHTON ISLAND AND PADLOPING ISLAND

Year	Clyde River	Kivitoo	Broughton Island		Padloping Island	Area Total
1951	128		23	107*	75	235
1952						
1953	147					
1954						
1955						
1956						
1957			79			
1958	180					
1959	183	47	80			
1960	199					
1961	210	22	70	135*	43	345
1962	224		110			
1963	225		152		53	430
1964	244			236*		480
1965	253		189		51	493
1966	255	-	209	265*	56	520

* Total Broughton - Padloping Island area

TABLE 25

DETAILED DISTRIBUTION OF ESKIMO POPULATION, 1966

Residence	No. Households	No. Persons
Pangnirtung	68	340
Cumberland Sound		
1. Twapine	5	30
2. Bon Accord	7	41
3. Imigen	8	37
4. Ikaloolik	3	18
5. Keemee	5	24
6. Iglootalik	3	19
7. Krepesha	5	35
8. Kingmuksu	9	50
Broughton Island	39	209
Padloping Island	11	56
Clyde River	16	91
East Coast		
1. Naksalokoluk	4	22
2. Akoleearkatak	5	28
3. Pingwasook	4	25
4. Supegayuktu	4	16
5. Ailaktali	4	20
6. Pinera	2	16
7. Tekikait	4	22
8. Nolooeet	3	15

TABLE 26

REGIONAL POPULATION DISTRIBUTION
1966

General Area	Total No. Households	Total No. Persons
Pangnirtung	113	594
Broughton Island	39	209
Padloping Island	11	56
Clyde River	46	255
TOTAL	209	1,114

TABLE 27

VILLAGE AND CAMP POPULATION DISTRIBUTION
1966

General Area	Total Population		Percentage Total	
	Village	Camps	Village	Camps
Pangnirtung	340	254	57.3	42.7
Broughton Island	209	0	100	0
Padloping Island	56	0	100	0
Clyde River	91	164	35.7	64.3
TOTAL	696	418		

TABLE 28

REGIONAL ESKIMO POPULATION STRUCTURE, SUMMER 1966.

Age Group Years	Sex	Cumberland Sound	Padloping Island	Broughton Island	Clyde River
0-4	M	62	5	20	25
	F	60	4	34	22
5-9	M	52	4	7	19
	F	50	7	17	22
10-14	M	38	4	18	28
	F	38	5	12	14
15-19	M	35	1	19	19
	F	37	2	8	14
20-24	M	18	1	5	9
	F	17	2	11	15
25-29	M	20	3	7	8
	F	16	2	7	6
30-34	M	25	1	6	9
	F	18	2	5	7
35-39	M	20	-	7	4
	F	20	1	3	6
40-44	M	9	2	1	4
	F	13	-	3	4
45-49	M	11	1	3	4
	F	8	2	3	4
50-54	M	3	1	3	4
	F	2	-	2	4
55-59	M	5	2	3	3
	F	6	2	4	-
60-64	M	4	-	-	-
	F	3	-	1	1
Over 65	M	3	-	-	-
	F	6	2	-	-

TABLE 29

ESKIMO POPULATION OF CUMBERLAND SOUND, 1944 to 1966

	June 1944	Jan. 1951	Jan. 1961	Aug. 1966
Avatuktoo	20	23	47	
Bon Accord	66	56	64	41
Iglootalik	19	16	32	19
Ikaloolik	40	31	39	18
Imigen	39	46	36	37
Keemee				24
Kekerten Island		26		
Kingmiksoo	48	9	52	50
Kingnait	31	4		
Krepishaw	33	37	38	35
Noonata	39	31	33	
Nowyakbik	19	11	25	
Opernavik	21	12		
Pangnirtung	45	75	98	340
Sukpeeweesuktoo and Abraham Bay		13	23	
Toakjuak	20	23	26	
Twapine		16	29	30
Ushualuk	14	32		
TOTAL	481+	461	542	594

+ Total includes 11 Eskimos on the way to Cape Dorset, 13 Eskimos on the way to Frobisher Bay and 3 Eskimos with unassigned destination.

Data taken from Dominion Bureau of Statistics, R.C.M.P. Records and Missionary Record Book.

TABLE 30

SELECTED ESKIMO POPULATION DATA, CUMBERLAND SOUND, 1857 to 1956

Date	Location	Population	Source
1857	Cumberland Sound	300	Boas, p. 18, 1888
1897	Kekerten	140	Wakeham, p. 24, 1898
1897	Blacklead Island	260	Wakeham, p.24, 1898
1902	Blacklead Island	194 (70 children 40 families)	Millward, p.25, 1930
1924	Bon Accord	6 families	Millward, p.25, 1930
1924	Toolooakjuak (40 miles south of Kingmiksoo)	8 families	Millward, p.25, 1930
1924	Blacklead Island	10 families	Millward, p.25, 1930
1925	Cumberland Sound	350 (65 families)	U.S. Hydrographic office, p. 391, 1947
1927	Kingmiksoo	41 (9 tents)	Millward, p.25, 1930
1927	Imigen	20	Millward, p. 25, 1930
1927	Blacklead Island	25	Millward, p. 25, 1930
1931	Pangnirtung	54	U.S. Hydrographic Office, p. 391, 1947
1951	Pangnirtung	40	Dunbar & Greenaway p. 98, 1956
1956	Pangnirtung	94	Arctic Pilot, p. 187, 1959

TABLE 31

SEASONAL VARIATIONS IN THE RATIO OF SHOTS FIRED TO SEALS KILLED

Type of hunt	Total No. of shots	Total No. of seals fired at	No. of Kills	% of seals killed	Shots fired per seal killed
Ringed Seals					
Seal on ice - hunter on ice (spring)	18	15	12	80.0	1.5
Seal in water - hunter on ice (June 11 - June 25)	36	23	13	56.5	2.8
(June 25 - July 11)	31	12	6	50.0	5.2
TOTAL	67	35	19	av. 54.3	av. 3.5
Seal in water - hunter in boat (June 22-Sept. 1)	237	49	18	36.7	13.2
Harp Seals					
Seal in water - hunter on ice	47	24	11	45.8	4.3
Seal in water - hunter in boat	57	35	9	25.7	6.3

TABLE 32

SEASONAL VARIATIONS IN CUMBERLAND SOUND HUNTING STATISTICS, 1966

	Spring May 21-June 11	Break-up June 12-July 11	Summer July 12-Sept. 1
Av. length of hunt (miles)	199	103	133
Av. duration of hunt (days)	6.6	3.6	2.7
Distance travelled/day (miles)	30	29	50
Ringed seals landed/man/day	0.5	1.3	1.0
Total seals landed/man/day (harp plus ringed seals)	0.5	1.4	1.1
Miles travelled/ringed seal landed (total mileage/total seals landed)	42.7	14.4	24.3
Miles travelled/seal landed (harp plus ringed seal)	42.7	13.5	21.7
Seals landed/hunt	4.7	7.7	6.1
Number of hunts	12	27	61
Number of hunters	16	40	121
Av. number of men per hunting day	1.33	1.48	1.98
Total number of hunting days	79	98	163
Total number of man/hunting days	105	145	326
Total distance travelled	2390	2777	8117
Total number of landed ringed seals	56	193	334
Total number of landed harp seals	0	15	39

TABLE 33

INVENTORY OF HUNTING EQUIPMENT FOR PANGNIRTUNG AND CAMPS IN CUMBERLAND SOUND

Summer 1966

Item	Pangnirtung	Twapine	Bon Accord	Imigen	Ikaloolik	Keemee	Iglootalik	Krepishaw	Kingmiksoo	Total
Komatiks	54	9	9	12	3	6	6	8	11	118
Pulling dogs	301	38	56	85	28	41	33	46	71	699
Small dogs	74	12	18	20	13	42	9	20	33	241
Ski-doos	27	5	0	0	0	0	0	2	2	36
Canoes	7	4	1	2	0	1	0	1	0	16
Rowboats	41	1	6	7	3	3	1	3	6	73
Whaleboats	8	2	1	2	2	2	1	4	2	24
Motors	44	5	10	7	3	4	3	3	6	85
Rifles	143	12	17	21	7	12	8	17	26	263
Seal nets	10	0	2	6	3	5	2	7	4	39
Fish nets	29	2	4	0	0	2	2	0	0	39
Telescopes and Binoculars	46	7	7	7	3	3	2	3	6	84

TABLE 34

LENGTH OF TIME SPENT ON WATER SURFACE BY RINGED & HARP SEALS IN CUMBERLAND SOUND

Length of time on Surface (in seconds)

Ringed Seal

	6.2	
	10.2	
	11.2	(sample of five seals)
	6.8	
	6.2	

Length of time on Surface (in seconds)

Harp Seal

No. Seen	Time	No. Seen	Time
1	15	1	21
1	6	herd	28
herd +	11	1	4,7,11 + +
3	17	herd	32
herd	35	1	13
herd	25	herd	9
1	11	1	19,4,6
herd	55	2	20
herd	24	4	7
1	41	1	12
herd	21	2	24
1	25,2,14	1	28

\+ Time in which at least one of the herd can be seen.

\+ +Many harp seals will surface three times in one spot. The three figures represent the lengths of each time the seal is above the surface of the water.

TABLE 35

SEASONAL HUNTING AREAS USED BY CAMPS IN CUMBERLAND SOUND

Camp	Hunting Areas in Square Miles		
	Winter (dog team and Ski-doo)	Summer (boat)	Overall area used
Twapine	837	639	908
Bon Accord	511	467	528
Imigen	113	257	279
Ikaloolik	62	127	173
Keemee	303	180	329
Iglootalik	427	197	427
Krepishaw	440	407	592
Kingmiksoo	1005	1226	1304

Total hunting area in Cumberland sound = 3,229 square miles.

TABLE 36

COMPARISON OF RINGED SEAL CATCH PER UNIT EFFORT DURING SPRING, BREAK-UP AND OPEN WATER SEASONS IN CUMBERLAND SOUND

Method	McLaren's Availability Index for Cumberland Sound	McLaren's Theoretical Catch*		Average Catch, 1966 (From Table 12)*
Hunting from larger boats in summer (open water)	14.1	0.1 seals/hunter/day/unit summer availability index = 1.4	2.1	1.0
Hunting from smaller powered boats in summer (open water)	14.1	0.2 seals/hunter/day/unit summer availability index = 2.8		
Hunting through holes in fast ice (break-up)	-	1.5 seals per day	1.5	1.3
Hunting on ice in spring	2	0.63 seals/hunter/day/unit availability index	1.3	0.5

* Seals per man per day.

TABLE 37

NUMBER AND VALUE OF FURS TRADED AT PANGNIRTUNG 1st AUGUST, 1965 TO 31st JULY, 1966*

	Polar Bear		Fox				Seals						Total
			White		Blue		Ringed		Harp		Bearded		
Month	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value
Aug. 65	1	$ 90.00	-	$ -	-	$ -	630	$5151.25	31	$ 402.00	2	$ 32.00	$5675.25
Sept.	1	85.00	-	-	-	-	470	2397.10	118	1462.45	12	173.50	4118.05
Oct.	-	-	-	-	-	-	810	4235.15	55	584.55	5	77.70	4897.40
Nov.	-	-	-	-	-	-	76	394.15	3	37.25	-	-	431.40
Dec.	-	-	2	31.25	-	-	467	2654.60	42	490.25	4	56.10	3232.20
Jan. 66	1	125.00	4	61.00	-	-	568	3595.85	9	103.40	3	46.20	3931.45
Feb.	-	-	7	137.00	1	7.50	615	3422.65	10	101.50	1	11.25	3679.90
Mar.	2	400.00	5	105.00	-	-	523	3515.75	4	53.50	-	-	4074.25
April	1	215.00	2	48.20	-	-	674	4866.60	5	81.00	1	17.40	5228.20
May	1	175.00	1	5.00	-	-	727	4902.80	1	12.00	-	-	5094.80
June	-	-	-	-	-	-	665	4835.62	5	92.50	-	-	4928.12
July	-	-	-	-	-	-	2141	16420.50	243	4249.10	5	81.00	20750.60
TOTAL	7	1090.00	21	387.45	1	7.50	8366	56392.02	526	7669.50	33	495.15	66041.62

* Compiled from Traders Fur Record Book

TABLE 38

BREAK-DOWN OF HOUSEHOLD INCOME AND SEAL KILL PER HOUSEHOLD AND HUNTER IN CUMBERLAND SOUND, AUGUST 1, 1965 - JULY 31, 1966*

	Pangnir-tung	Twapine	Bon Accord	Imigen	Ikaloolik	Keemee	Iglootalik	Krepishaw	Kingmiksoo
Total amount	27417.17	8270.15	7431.20	4091.70	1930.50	2688.80	1268.65	3824.30	7458.65
Household av.	391.38 (456.95)	1654.03	928.90	511.46	643.50	672.20	634.32	764.86	932.33
Total Number Ringed Seals	3366	962	859	614	255	395	208	577	1019
Ringed Seals per Household	48.0 (56.1)	192.4	107.4	76.8	85.0	98.7	104.0	115.4	1274
Ringed Seals per Hunter	51.0	160.3	85.9	76.8	85.0	65.9	52.0	64.1	72.8
Total Number Harp Seals	213	99	113	18	7	23	0	12	26
Harp Seals per Household	3.0 (3.6)	19.8	14.1	2.3	2.3	5.8	0	2.4	3.3
Harp Seals per Hunter	3.2	16.5	11.3	2.3	2.3	3.8	0	1.3	1.9
Number of Hunters	66	6	10	8	3	6	4	9	14
Number of Households	70 (60)	5	8	8	3	4	2	5	8
Hunters per Household	0.90 (1.1)	1.20	1.25	1.00	1.00	1.50	2.00	1.00	1.67

* In this table, the 1965-66 winter distribution of camp households is used.

In Pangnirtung a number of households do not have hunters, while in the camps each household contains at least one hunter. For proper comparison, therefore, figures in the brackets represent only the Pangnirtung households that contain at least one hunter.

TABLE 39

MONTHLY BREAKDOWN OF HUNTING INCOME PER CAMP - CUMBERLAND SOUND

Name of Camp: Kingmiksoo

Month	Ringed Seals Traded	Value	Harp Seals Traded	Value	Bearded Seals Traded	Value	Others
August	62	$ 576.50					
September	99	590.15	15	$184.00	2	$30.00	
October	134	734.60	7	69.25			
November							
December							
January	67	366.55					
February	120	714.25			1	11.25	$20.00
March	34	253.65					
April	150	1097.60					
May	125	913.35					
June	45	341.60					
July	183	1480.90	4	75.00			
TOTAL:	1019	7069.15	26	328.25	3	41.25	20.00

Name of Camp: Imigen

Month	Ringed Seals Traded	Value	Harp Seals Traded	Value	Bearded Seals Traded	Value	Others
August	14	$ 101.50					
September	49	214.55	4	$ 43.45	1	$16.50	
October	80	449.10	4	48.80			
November							
December	51	285.70	1	11.25			
January	72	419.60					
February	52	279.35					
March	16	118.80					
April	43	261.75					
May	63	341.90					
June	17	105.80					
July	157	1249.55	9	124.10			
TOTAL:	614	3827.60	18	227.60	1	16.50	

Name of Camp: Twapine

Month	Ringed Seals Traded	Value	Harp Seals Traded	Value	Bearded Seals Traded	Value	Others
August	113	$1016.75	6	$81.00	1	$15.00	
September	19	91.65	8	116.55	1	16.00	
October	106	521.00	6	65.00			
November	11	57.55					
December	136	762.05	34	401.80	2	29.70	
January	45	221.45					
February	84	464.95					
March	65	471.80	1	17.00			
April	46	399.65	4	68.00	1	17.40	
May	95	660.55					
June	99	715.80					
July	143	1001.00	40	668.50			
TOTAL:	962	6384.20	99	1417.85	5	78.10	

Name of Camp: Pangnirtung

Month	Ringed Seals Traded	Value	Harp Seals Traded	Value	Bearded Seals Traded	Value	Others
August	342	$2586.25	12	$149.00	1	$17.00	
September	108	517.35	32	386.80			
October	184	985.20	10	116.00	3	44.70	
November	21	98.95	2	23.25			
December	155	903.65	5	55.95	2	26.40	
January	244	1314.10	6	70.45	3	46.20	
February	212	1194.85	10	101.50			
March	251	1691.55	2	25.50			
April	273	2010.65	1	13.00			
May	271	1755.05					
June	318	2341.02	5	92.50			
July	987	7522.95	128	2299.85	2	29.00	
TOTAL:	3366	22921.57	213	3333.80	11	163.30	

Name of Camp: Krepishaw

Month	Ringed Seals Traded	Value	Harp Seals Traded	Value	Bearded Seals Traded	Value	Others
August	4	$ 36.75					
September	52	281.10					
October	105	541.90	5	$ 54.00	1	$16.50	
November							
December							
January	107	579.20	1	11.25			
February	65	335.20					
March	72	466.40					
April	20	130.20					
May	76	601.10					
June							
July	76	632.20	6	115.50	1	23.00	
TOTAL:	577	3604.05	12	180.75	2	39.50	

Name of Camp: Bon Accord

Month	Ringed Seals Traded	Value	Harp Seals Traded	Value	Bearded Seals Traded	Value	Others
August	36	$ 294.25	10	$133.00			
September	36	184.15	53	646.45	8	111.00	
October	55	287.60	16	163.85			
November							
December	78	448.05	1	10.00			
January	62	314.45	1	7.50			
February	20	114.20					
March	24	148.90	1	11.00			
April	45	291.25					
May	75	497.50					
June	85	701.00					
July	343	2447.90	31	543.75	2	29.00	
TOTAL:	859	5729.25	113.	1515.55	10	140.00	

Name of Camp: Ikaloolik

Month	Ringed Seals Traded	Value	Harp Seals Traded	Value	Bearded Seals Traded	Value	Others
August							
September	40	$214.55	2	$26.20			
October	32	169.55	2	26.55	1	$16.50	
November							
December	13	75.45					
January	37	215.20					
February	13	62.60					
March							
April	13	77.80					
May	13	65.80	1	12.00			
June	13	87.00					
July	81	841.30	2	40.00			
TOTAL:	255	1809.25	7	104.75	1	16.50	

Name of Camp: Keemee

Month	Ringed Seals Traded	Value	Harp Seals Traded	Value	Bearded Seals Traded	Value	Others
August							
September	39	$ 169.75					
October	89	415.60	4	31.25			
November							
December	29	150.45	1	11.25			
January	17	73.05					
February	17	87.55					
March	33	187.95					
April	30	238.40					
May	6	43.70					
June	36	237.40					
July	99	719.80	18	286.40			
TOTAL:	395	2323.65	23	328.90			

Name of Camp: Iglootalik

Month	Ringed Seals Traded	Value	Harp Seals Traded	Value	Bearded Seals Traded	Value	Others
August							
September	9	$ 41.05					
October	2	10.70					
November	37	198.65					
December							
January							
February	20	87.85					
March	5	24.90					
April	51	332.90					
May							
June	44	257.40					
July	40	315.20					
TOTAL:	208	1268.65					

Name of Camp: Unassigned fur sales

Month	Ringed Seals Traded	Value	Harp Seals Traded	Value	Bearded Seals Traded	Value	Others
August	63	$539.25	3	$39.00			
September	19	92.80	4	59.00			
October	23	119.90	1	9.85			
November	7	39.00	1	14.00			
December	5	29.25					
January	17	92.25	1	14.20			
February	12	83.85					
March	23	151.80					
April	3	26.40					
May	3	23.85					
June	8	48.60					
July	32	209.70	5	96.00			
Total:	215	1456.65	15	232.05			

TABLE 40
OPERATIONAL COSTS OF SEAL HUNTING IN CUMBERLAND SOUND, 1966

SPRING		May 21 - June 11
Number of Hunts with ski-doos	2	Total Cost
Total gallons of gasoline used	47	$46.06
Total quarts of oil used	10	$ 5.50
		$51.56

Cost of fuel per landed ringed seal= $8.59.

Ringed		Harp
6	Number of seals landed	0
7	Theoretical number of Seals Killed	0
1.5	Average number of Shots Fired Per Seal	0
11	Total Number of Shots	0
$2.09	Total Cost of Ammunition	0
$0.35	Cost of Ammunition per Landed Seal	0

Ski-doo	Total Operational Costs	Dog Team
$0.35	Ammunition	$0.35
8.59	Fuel	-
$8.94		$0.35

TABLE 41

OPERATIONAL COSTS OF SEAL HUNTING IN CUMBERLAND SOUND, 1966

BREAK-UP		June 12 - July 11
Number of hunts	24	Total Cost
Total gallons of gasoline used	294	$288.12
Total quarts of oil used	52.3	28.77
		$316.89

Cost of fuel per seal landed - $1.89

Ringed		Harp
	Number of Seals Landed	
159		9
	Theoretical Number of Seals Killed	
190		26
	Average Number of Shots Fired per Seal Killed	
3.5		4.3
	Total Number of Shots	
665		112
	Total Cost of Ammunition	
$126.35		$21.28
	Cost of Ammunition per Seal Landed	
$0.79		$2.36

	Total Operational Costs	
$0.79	Ammunition	$2.36
$1.89	Fuel	$1.89
$2.68		$4.25

TABLE 42

OPERATIONAL COSTS OF SEAL HUNTING IN CUMBERLAND SOUND, 1966

OPEN WATER		July 12 - September 4
Number of hunts	70	Total Cost
Total gallons of gasoline used	773	$757.54
Total quarts of oil used	99.1	54.51
		$812.05

Cost of fuel per landed seal $2.17

Ringed		Harp
	Number of seals landed	
335		32
	Theoretical Number of Seals Killed	
434		90
	Average Number of Shots Fired Per Seal Killed	
13.2		6.3
	Total Number of Shots	
5729		567
	Cost of Ammunition per Landed Seal	
$2.06[1]		$2.76[2]
	Total Operational Cost	
$2.06	Ammunition	$2.76
2.17	Fuel	2.17
$4.23		$4.93

1 Number of shots at .222 Calibre = 3380; Price of .222 Calibre bullets per landed ringed seal = $1.92; Number of shots of .22 Calibre = 2349; Price of .22 Calibre bullet per landed ringed seal = $0.14.

2 .222 Calibre bullets were used.

TABLE 43

ESTIMATE OF ANNUAL SEASONAL DEPRECIATION AND MAINTENANCE COSTS, IN CUMBERLAND SOUND, 1966

Item	Annual Cost	Spring (75 days)		Break-up (30 days)	Open-water (100 days)	Annual Period of use (days)
		Ski-doo	Dogs			
Weapons	$ 60	$0.17	$0.17	$0.17	$0.17	365
Motor	70	0.00	0.00	0.54	0.54	130
Ski-doo	200	1.00	0.00	0.00	0.00	200
Komatik	10	0.05	0.05	0.05	0.00	200
Tent	10	0.04	0.04	0.04	0.04	200
Boat	30	0.00	0.00	0.23	0.23	130
	$380	$1.26*	$0.26*	$1.03*	$0.98*	

* Depreciation and maintenance costs per day

TABLE 44

SUMMARY OF HUNTING COSTS FOR CUMBERLAND SOUND MAY-SEPT, 1966

	Spring		Break-up	Open-water
	Ski-doo	Dog		
Average maintenance and depreciation costs per day	$1.26	$0.26	$1.03	$0.98
Seals per day	0.5	0.5	1.4	1.1
Depreciation and maintenance costs per Seal	$2.52	$0.52	$0.74	$0.89
Gross profit per ringed seal (Tables 19-21)	$-1.54	$7.05	$4.72	$3.17
Gross profit per harp seal	-	-	$13.23	$12.55
Net profit per ringed seal	$-4.06	$6.53	$ 3.98	$ 2.28
Net profit per harp seal	-	-	$12.69	$11.23

TABLE 45

HARVEST OF SEALS AND HUNTING AREAS PER HUNTER IN CUMBERLAND SOUND,*

August 1, 1965 - July 31, 1966

Camp	Gross Area	Number of Hunters	Square Miles per Hunter	Ringed Seals killed per sq. mi.	Total Harp and Ringed Seals killed per sq. mi.
Twapine	908	6	151	1.06	1.17
Bon Accord	528	10	53	1.63	1.86
Imigen	279	8	35	2.20	2.27
Ikaloolik	173	3	58	1.47	1.52
Keemee	329	6	55	1.20	1.27
Iglootalik	427	4	107	0.49	0.49
Krepishaw	592	9	66	0.97	1.00
Kingmiksoo	1304	14	93	0.78	0.80
Total exploited area in Cumberland Sound	3229	126	26	2.56	2.73

* Calculated from number of sealskins traded

TABLE 46

SEAL SPECIMENS TAKEN IN CUMBERLAND SOUND, 1966

Date 1966	Species	Sex	Length in.	Girth in.	Blubber in.	Location
May 18	Ringed	F	50.0	44.0	2.0	North of Kekertelung Island
May 18	Ringed	M	48.0	45.0	1.88	North of Kekertelung Island
May 21	Ringed	F	50.0	47.5	1.88	Clearwater Fjord
May 21	Ringed	F	51.5	43.75	1.69	Clearwater Fjord
May 21	Ringed	M	49.25	44.75	1.31	Clearwater Fjord
May 21	Ringed	M	42.75	39.0	1.31	West of Nunatak Island
June 8	Ringed	M	43.0	39.5	1.75	3 miles from mouth of Pangnirtung Fjord
June 10	Ringed	M	51.0	43.0	1.25	Near Oomuna
June 11	Ringed	M	43.25	38.5	1.75	Near Oomuna
June 14	Ringed	M	46.0	38.5	2.75	In front of Pang. Fjord
June 14	Ringed	M	37.75	32.5	-	In front of Pang. Fjord
June 14	Ringed	M	40.5	35.0	1.50	In front of Pang. Fjord
June 16	Ringed	F	46.0	35.0	1.0	-
June 17	Ringed	F	39.0	30.75	1.0	-
June 18	Ringed	F	38.25	34.5	1.25	-
June 25	Ringed	M	28.0	32.75	1.25	3 miles off Nasauya Pt.
June 26	Ringed	M	44.25	39.0	-	3 miles off Nasauya Pt.
June 26	Ringed	M	37.0	32.5	-	3 miles off Nasauya Pt.
June 26	Ringed	M	42.0	36.75	1.25	3 miles off Nasauya Pt.
July 11	Ringed	M	36.5	32.0	1.13	Middle of Cumberland Sound off Kingmiksu
July 20	Ringed	F	49.5	36.5	0.94	Between Kaxoudluin Island and C. Edwards
July 20	Ringed	M=	38.0	29.75	0.82	Between Kaxoudluin Island and C. Edwards
July 20	Ringed	F=	35.75	27.5	0.75	Between Kaxoudluin Island and C. Edwards
July 20	Ringed	M	37.0	29.0	0.63	Between Kaxoudluin Island and C. Edwards
July 20	Ringed	M=	35.5	28.75	0.75	Between Kaxoudluin Island and C. Edwards
July 20	Ringed	M=	38.0	31.25	1.0	Between Kaxoudluin Island and C. Edwards
July 20	Ringed	M=	36.75	27.5	0.75	Between Kaxoudluin Island and C. Edwards
July 20	Ringed	M=	41.25	29.75	1.13	Between Kaxoudluin Island and C. Edwards
July 20	Ringed	M=	38.75	31.38	1.38	Between Kaxoudluin Island and C. Edwards

Date 1966	Species	Sex	Length in.	Girth in.	Blubber in.	Location
July 20	Ringed	M=	39.5	29.5	0.88	Between Kaxoudluin Island and C. Edwards
July 20	Ringed	M	37.75	29.5	1.13	Between Kaxoudluin Island and C. Edwards
July 20	Ringed	M	41.25	31.25	0.75	Between Kaxoudluin Island and C. Edwards
August 8	Ringed	M	48.75	38.0	0.75	Kangiloo Fjord
August 20	Ringed	F	49.0	44.5	1.75	5 miles north of Krepis
August 23	Ringed	M	46.0	37.0	1.0	Chidliak Bay
August 1-7	Ringed	M	45.0	33.5	0.75	Nettilling Fjord
August 1-7	Ringed	M	37.5	28.5	1.00	Nettilling Fjord
August 1-7	Ringed	F	42.25	32.25	0.83	Nettilling Fjord
August 1-7	Ringed	F	47.5	34.75	1.06	Nettilling Fjord
August 1-7	Ringed	F	-	-	-	Nettilling Fjord
August 1-7	Ringed	M	37.0	29.25	1.38	Nettilling Fjord
August 1-7	Ringed	F	34.5	27.5	0.94	Nettilling Fjord
August 1-7	Ringed	F	34.75	29.25	1.25	Nettilling Fjord
August 1-7	Ringed	F	39.5	30.5	1.00	Nettilling Fjord
August 1-7	Ringed	F	-	-	-	Nettilling Fjord
July 11	Harp	M	68.0	45.5	1.75	Middle of Cumberland Sound
July 11	Harp	F	66.0	44.0	-	Off Kingmiksu
August 8	Harp	M	67.0	47.0	1.81	Kangiloo Fjord
August 8	Harp	F	61.5	42.0	1.5	Kangiloo Fjord
August 8	Harp	M	62.0	46.75	2.0	Kangiloo Fjord
August 8	Harp	M	64.75	43.00	1.63	Kangiloo Fjord
August 8	Harp	M	62.75	48.00	1.75	Kangiloo Fjord
August 8	Harp	F	69.25	47.75	2.75	Kangiloo Fjord
August 8	Harp	M	67.0	43.75	1.38	Kangiloo Fjord
August 8	Harp	F	64.0	45.5	1.94	Kangiloo Fjord
August 8	Harp	F	62.25	45.5	1.94	Kangiloo Fjord
August 8	Harp	F	58.0	48.5	2.25	Kangiloo Fjord
August 20	Harp	F	65.0	49.5	3.0	Unknown
August 20	Harp	F	49.5	36.0	1.63	Unknown
July 20	Bearded	F	92.0	71.0	1.75	Shulut Bay
July 20	Bearded	M	89.0	59.5	1.63	Shulut Bay

= Denotes seal born 1966 (Netsiavinuk)

TABLE 47

INVENTORY OF HUNTING EQUIPMENT AUGUST 1966

Items	Pangnirtung	Broughton Island	Padloping Island	Clyde River
Sleds	118	28	10	49
Pulling dogs	699	117	84	465
Skidoos	36	21	4	7
Canoes	16	9	3	25
Rowboats	73	12	2	0
Whaleboats	24	6	1	1
Punts	0	0	2	1
Motors	85	27	3	27
Rifles	263	66	21	105
Telescopes	84	39	11	27
Seal nets	39	9	4	0
Fish nets	39	8	5	22

TABLE 48

AMOUNT AND VALUE OF FUR TAKE BY LOCATION, PER CAPITA AND HOUSEHOLD, 1st AUGUST, 1965 TO 31st JULY, 1966

	Polar Bear			White Fox			Blue Fox			
	Catch per		Value per	Catch per		Value per	Catch per		Value per	
Place	Capita	House	House	Capita	House	House	Capita	House	House	
			$			$			$	
Cumberland Sound (total)	.01	.07	10.40	.03	.20	3.68	-	-	0.07	
Pangnirtung	.01	.07	11.60	.02	.14	3.33	.002	.014	.12	
Padloping Island	.21	1.09	148.18	.21	1.09	15.82	-	-	-	
Broughton Island	.06	.36	60.38	.13	.72	11.18	-	-	-	
Clyde River *	.06	.33	42.83	.42	2.30	33.19	-	.04	.26	
	Ringed Seal			Harp Seal			Bearded Seal			Average Income all furs per House
Cumberland Sound (total)	12.00	79.60	537.07	.90	5.00	73.04	.05	.31	4.71	$628.97
Pangnirtung	9.9	49.6	382.03	.62	3.5	55.56	.03	.19	2.72	455.36
Twapine	32.0	192.4	1,276.89	3.30	19.8	283.57	.16	1.00	15.62	1,654.03
Bon Accord	20.4	122.7	818.46	2.76	16.14	216.50	.24	1.42	23.26	1,061.26
Imigen	16.6	76.7	478.45	.50	2.20	28.45	-	-	2.06	511.46
Ikaloolik	14.2	85.0	603.08	.50	2.30	34.92	-	.30	5.50	643.50
Keemee	16.4	79.0	464.73	.90	4.60	65.78	-	-	-	537.76
Iglootalik	10.9	69.30	422.89	-	-	-	-	-	-	422.89
Krepesha	16.4	115.40	720.81	.34	2.40	16.15	-	.40	7.90	744.86
Kingmiksoo	20.5	113.22	785.46	.52	2.90	36.47	.06	.33	4.58	828.73
Padloping Island	17.2	87.36	436.36	-	-	-	-	-	-	600.36
Broughton Island	14.39	77.10	422.87	-	-	-	-	-	0.38	494.82
Clyde River*	7.65	42.39	208.06	.11	.63	4.78	-	-	0.34	289.48

* 1st June 1965 to 31st May 1966.

TABLE 49

ESTIMATED GROSS REGIONAL INCOMES

Year	Native Products	Wages	Social Welfare	Total	Per Household Income
Cumberland Sound					
1956	$17,926	$ 5,200	$29,380	$52,506	$ 416.71
1964	163,573	38,863	30,600	233,036	1,879.32
1965	97,000	98,000	67,000	262,000	2,183.00
Clyde River					
1955	6,000	4,000	12,780	22,780	-
1956	4,000	5,000	12,060	21,060	-
1957	4,180	5,250	11,450	20,880	-
1958	13,035	7,000	8,800	28,835	758.81
1959	12,042	10,000	10,202	32,244	786.44
1960	12,760	12,000	14,200	38,960	865.78
1961	9,266	16,000	18,746	44,012	978.04
1962	25,000	21,000	25,000	71,000	1,613.64
1963	29,000	15,000	28,000	72,000	1,636.36
1964	26,000	21,000	23,000	70,000	1,521.74
1965	26,000	30,300	23,000	79,300	1,717.39
Broughton Island					
1965	34,500	35,000	22,100	91,600	2,290.00
Padloping Island					
1965	8,800	6,000	6,000	20,800	1,890.00

TABLE 50

ESTIMATED TOTAL ESKIMO INCOME ALL SOURCES AUGUST 1965 TO JULY 1966

Place	Furs	Crafts	Wages	Welfare	Social Asst.	Total
Cumberland Sound	$66,042	$ 5,000	$100,725	$36,410	$38,183	$246,360
Broughton Island	19,298	3,000	73,440[1]	9,736	7,379	112,853
Padloping Island	8,819	-	6,000	4,924	1,064	20,807
Clyde River[2]	13,316	2,760	34,412	11,916	5,370	67,774
REGIONAL TOTAL	$107,475	$10,760	$214,577	$62,986	$51,996	$447,794

1. Includes wages earned at Cape Hooper and Cape Dyer
2. Period 1st June 1965 to 31st May 1966.

TABLE 51

PERCENTAGE BREAKDOWN OF ESTIMATED ESKIMO INCOME FROM ALL SOURCES AUGUST 1965 TO JULY 1966.

Place	Furs	Crafts	Wages	Welfare	Social Asst.
	%	%	%	%	%
Cumberland Sound	26.8	2.0	40.9	14.8	15.5
Broughton Island	17.2	2.6	65.1	8.6	6.5
Padloping Island	42.4	0.0	28.8	23.7	5.1
Clyde River[1]	19.6	4.1	50.8	17.6	7.9
REGIONAL TOTAL	24.0	2.4	47.9	14.1	11.6

1. Period 1st June 1965 to 31st May 1966.

TABLE 52

AVERAGE ESKIMO PER CAPITA HOUSEHOLD INCOME 1st AUGUST, 1965 TO 31st JULY, 1966

Place	Total Income		% Total Income		% Earned Income		Total Income	
	Earned	Unearned	Earned	Unearned	Native Product[1]	Wages	Per Capita	Per Household
Cumberland Sound	$171,767	$ 74,593	69.7	30.3	41.4	58.6	$414.75	$2,180.18
Broughton Island	95,738	17,115	84.8	15.2	23.3	76.7	539.97	2,893.67
Padloping Island	14,819	5,988	71.2	28.8	59.5	40.5	371.55	1,891.55
Clyde River[2]	50,488	17,286	74.5	25.5	31.8	68.2	265.78	1,473.35
REGIONAL TOTAL	$332,812	$114,982	74.3	25.7	35.5	64.5	$401.97	$2,142.55

1. Fur and Handicraft Sales.

2. Period 1st June, 1965 to 31st May, 1966.

TABLE 53

NUMBER OF WAGE EARNING POSITIONS OCCUPIED BY NATIVE RESIDENTS JUNE 1965 TO AUGUST 1966

Place	Government		Non-Government		Total	
	Full Time	Part Time	Full Time	Part Time	Full Time	Part Time
Pangnirtung	8	5	10	6	18	11
Padloping Island	1	1	-	-	1	1
Broughton Island	4	2	7	2	11	4
Clyde River	4	2	3	1	7	3
Cape Hooper	-	-	1	-	1	-
Cape Dyer	-	-	3	-	3	-
REGIONAL TOTAL	17	10	24	9	41	19

TABLE 54

ESTIMATED WAGE EARNINGS BY NATIVE RESIDENTS JUNE 1965 TO AUGUST 1966

Place	Government	% Total	Non-Government	% Total	Total
Pangnirtung	$72,650	72.1	$28,075	27.9	$100,725
Broughton Island	35,220	47.9	38,220	52.1	73,440*
Padloping Island	6,000	100.0	-	-	6,000
Clyde River	25,432	73.9	8,980	26.1	34,412
REGIONAL TOTAL	$139,302	64.9	$75,275	35.1	$214,577

* Includes earnings from Cape Hooper and Cape Dyer

TABLE 55

ESTIMATED EARNED ESKIMO INCOME SOURCES 1st AUGUST 1965 TO 31 JULY 1966

Place	Permanent Wage Positions					
	Government	Non-Government Commercial	DEW Line	Casual Labour and Construction	Native Products[1]	Total
Cumberland Sound	$37,650	$28,075	-	$35,000	$71,042	$171,767
Broughton Island	18,800	8,220	$30,000	16,420	22,298	95,738
Padloping Island	5,500	-	-	500	8,819	14,819
Clyde River[2]	23,572	7,980	-	2,860	16,076	50,488
REGIONAL TOTAL	$85,522	$44,275	$30,000	$54,780	$118,235	$332,812

1. Furs and Handicrafts
2. Period 1st June 1965 to 31st May 1966

TABLE 56

PERCENTAGE BREAKDOWN OF EARNED ESKIMO INCOME 1st AUGUST 1965 TO 31st JULY 1966

	%	%	%	%	%
Cumberland Sound	21.9	16.3	-	20.4	41.4
Broughton Island	19.6	8.6	31.3	17.2	23.3
Padloping Island	37.1	-	-	3.4	59.5
Clyde River	46.7	15.8	-	5.7	31.8
REGIONAL TOTAL	25.7	13.3	9.0	16.5	35.5

TABLE 57

PERCENTAGE BREAKDOWN OF WAGE EARNINGS 1st AUGUST, 1965 TO 31st JULY, 1966

Place	Permanent Wage Positions			Casual Labour and Construction
	Government	Commercial	DEW Line	
	%	%	%	%
Cumberland Sound	37.4	27.9	-	34.7
Broughton Island	25.6	11.3	40.8	22.3
Padloping Island	91.7	-	-	8.3
Clyde River	68.5	23.2	-	8.3
Regional	39.9	20.6	14.0	25.5

TABLE 58

GAME REPORTS FOR PANGNIRTUNG, N.W.T., 1958-1966*

Year	Fox			Polar	Ringed Seals					Seals				White	
	White	Cross	Red	Bear	Silver	Common	White	Traded	Killed	Harp	Bearded	Walrus	Narwhal	Whale	Caribou
58-59	594	5	1	11	696	2,405	63	3,164	9,164**			13	10	62	500
59-60	95	3	-	20	2,798	1,893	28	4,719	7,069**	-	-	21	-	153	200
60-61	948	6	12	19	2,749	3,750	-	6,499	8,644**	-	-	15	35	155	200
61-62	545	-	-	9	1,751	2,771	-	4,522	-	-	-	23	90	60	300
62-63	4	-	-	15	2,553	4,880	-	7,433	-	-	-	1	33	-	425
63-64	46	-	-	8	3,809	6,020	-	9,829	-	-	34	-	-	-	450
64-65	691	-	-	15	-	-	-	12,490***	-	-	31	11	-	-	1,200
65-66	65	2	-	21	-	-	-	11,002***	-	295	26	22	11	-	600

* Reporting period from June 20th

** Estimated total ringed seals killed

*** Probably includes Broughton and Padloping Islands

TABLE 59

GAME REPORTS FOR CLYDE RIVER, N.W.T. 1953-1966*

		Fox		Polar	Ringed Seals					Seals				
Year	Wolf	White	Cross	Bear	Silver	Common	White	Traded	Killed	Harp	Bearded	Walrus	Narwal	Caribou
53	-	123	-	25	-	-	-	-	-	-	-	-	-	-
53-54	-	-	-	31	-	-	-	-	-	-	-	-	-	-
54-55	-	-	-	30	-	-	-	-	-	-	-	-	-	80
55-56	-	200	-	52	200	138	150	488	4,000**	-	87	12	48	162
56-57	1	101	-	16	252	-	99	351	1,500**	-	60	-	40	100
57-58	-	235	-	27	249	-	7	356	-	-	-	-	40	100
58-59	-	478	-	40	-	-	-	436	-	-	10	1	12	25
59-60	1	412	-	60	-	-	-	279	-	-	-	3	25	100
60-61	-	500	-	69	-	-	-	169	-	-	-	5	54	125
61-62	-	300	3	58	-	-	-	469	-	-	-	3	42	328
62-63	-	14	-	40	-	-	-	1,125	2,125**	-	8	6	50	200
63-64	4	368	3	40	-	-	-	1,500	2,700**	-	-	8	25	250
64-65	-	679	16	65	-	-	-	1,200	2,400**	-	-	-	18	225
65-66	1	106	2	13	217	1,596	-	1,813	3,113**	32	85	-	15	251

* Reporting period from June 30th

** Estimated total ringed seals killed

TABLE 60

COMPARATIVE HUNTING RETURNS PADLOPING ISLAND AND BROUGHTON AND PADLOPING COMBINED 1st APRIL 1965 TO 31st. AUGUST 1966

	Seals			Polar Bear			White Fox		
Month	Total	Padloping	% Total	Total	Padloping	% Total	Total	Padloping	Total
Apr 65	129	42	33	1	1	100	14	7	50
May	402	46	11	-	-	-	-	-	-
Jun	950	201	21	-	-	-	-	-	-
Jul	640	126	19	5	3	60	-	-	-
Aug	232	34	14	-	-	-	-	-	-
Sep	228	63	27	-	-	-	-	-	-
Oct	283	46	17	-	-	-	-	-	-
Nov	146	23	16	12	8	66	-	-	-
Dec	582	118	20	-	-	-	8	5	62
Jan 66	209	61	29	1	0	0	15	4	26
Feb	259	92	36	1	0	0	9	0	0
Mar	195	98	50	-	-	-	7	2	28
Apr	253	119	47	4	1	25	1	1	100
May	263	85	32	7	3	43	-	-	-
Jun	548	80	14	-	-	-	-	-	-
Jul	770	142	18	-	-	-	-	-	-
Aug	761	134	17	-	-	-	-	-	-
TOTAL	6,850	1,510	22	31	16	51	54	19	35

TABLE 61

FURS TRADED AT CLYDE RIVER, OCTOBER 1963 - MAY 1966

			Fox		Ringed Seal		Seals	
Month	Year	Polar Bear	White	Blue	Silver	Common	Bearded	Harp
Oct	63	-	-	-	13	46	1	-
Nov		20	-	-	77	93	-	-
Dec		5	19	-	59	93	1	-
Jan	64	2	49	1	51	134	-	-
Feb		1	66	-	30	98	-	-
Mar		-	61	1	18	110	-	-
Apr		2	58	-	6	119	-	-
May		2	33	-	14	195	-	-
Jun		-	9	-	55	108	-	-
Jul		-	-	-	103	165	-	-
Aug		4	-	-	43	144	-	1
Sep		5	-	-	-	101	-	1
Oct		11	-	-	11	86	1	-
Nov		23	92	-	8	135	-	-
Dec		10	265	6	-	163	-	-
Jan	65	-	105	-	7	82	-	-
Feb		1	61	3	2	93	-	-
Mar		-	80	-	-	173	-	-
Apr		-	61	-	-	151	-	-
May		11	31	-	11	190	-	-
Jun		-	-	-	78	63	-	-
Jul		-	-	-	63	177	-	-
Aug		-	-	-	18	141	-	1
Sept		-	-	-	103	219	1	12
Oct		3	-	-	9	170	-	14
Nov		3	3	-	14	170	-	2
Dec		1	30	-	-	116	-	-
Jan	66	-	6	-	-	113	-	-
Feb		-	15	-	-	96	-	-
Mar		-	38	1	-	151	-	-
Apr		-	6	-	-	151	-	-
May		6	8	1	-	98	-	-

TABLE 62

NUMBER AND VALUE OF FURS TRADED AT PANGNIRTUNG 1st AUGUST, 1965 TO 31st JULY, 1966

Month	Polar Bear No.	Polar Bear Value	Fox White No.	Fox White Value	Fox Blue No.	Fox Blue Value	Seals Ringed No.	Seals Ringed Value	Seals Harp No.	Seals Harp Value	Seals Bearded No.	Seals Bearded Value	Total Value
Aug 65	1	$ 90.00	-	$ -	-	$ -	630	$5,151.25	31	$ 402.00	2	$32.00	$5,675.25
Sep	1	85.00	-	-	-	-	470	2,397.10	118	1,462.45	12	173.50	4,118.05
Oct	-	-	-	-	-	-	810	4,235.15	55	584.55	5	77.70	4,897.40
Nov	-	-	-	-	-	-	76	3,941.15	3	37.25	-	-	431.40
Dec	-	-	2	31.25	-	-	467	2,654.60	42	490.25	4	56.10	3,232.20
Jan 66	1	125.00	4	61.00	-	-	568	3,595.85	9	103.40	3	46.20	3,931.45
Feb	-	-	7	137.00	1	7.50	615	3,422.65	10	101.50	1	11.25	3,679.90
Mar	2	400.00	5	105.00	-	-	523	3,515.75	4	53.50	-	-	4,074.25
Apr	1	215.00	2	48.20	-	-	674	4,866.60	5	81.00	1	17.40	5,228.00
May	1	175.00	1	5.00	-	-	727	4,902.80	1	12.00	-	-	5,094.80
Jun	-	-	-	-	-	-	665	4,835.62	5	92.50	-	-	4,928.12
Jul	-	-	-	-	-	-	2,141	16,420.50	243	4,249.10	5	81.00	20,750.60
TOTAL	7	1,090.00	21	387.45	1	7.50	8,366	56,392.02	526	7,669.50	33	495.15	66,041.62

TABLE 63

EXPENDITURES ON SELECTED HUNTING EQUIPMENT, AMMUNITION AND FUEL, 1965-1966

Item	Cumberland Sound		Broughton and Padloping		Clyde River area	
Equipment	Amount	$/Household	Amount	$/Household	Amount	$/Household
Rifles	94	$ 85	34	$ 70	20	$ 48
Outboard Motors	17	65	14	127	5	49
Boats and Canoes	18	65	15	123	3	19
Skidoos	15	104	7	112	3	53
Total/Household		$319		$432		$169
Ammunition						
Rounds 22 long, short magnum	401,300	$ 69	62,000	$ 43	34,000	$ 14
Rounds .222, .243 30-30, 303, 270 etc.	95,880	171	43,400	191	26,820	127
Total/Household		$240		$234		$141
Fuel						
Motor Gasoline (gal)	27,967	$238	9,200	$181	1,710*	$ 37
Motor oil (qts.)	3,201	15	1,600	18	*	
Total/Household		$253		$199		$ 37
Total all hunting expenditures		812		865		347

* Utilize abandoned oil and gasoline stocks.

EXPENDITURES ON SELECTED FOOD 1965-66

Item	Cumberland Sound Cost/House	Cumberland Sound Amt./Capita	Broughton and Padloping Cost/House	Broughton and Padloping Amt. Capita	Clyde River Area Cost/House	Clyde River Area Amt. Capita
Flour	$136	185.8 lbs.	$120	151.3 lbs.	$ 95	123.5 lbs.
Sugar	37	51.7	14	18.8	81	96.9
Butter, Margarine and lard	29	14.7	131	80.7	18	7.3
Dry Milk	37	8.4	73	16.1	24	5.0
Tea	35	5.3	35	5.1	36	5.0
Crackers	12	5.8	16	7.5	31	14.0
Tobacco*	79	25.2 pks**	95	34.8 pks**	141	55.4 pks**
Chewing gum (package only)	11	42.0 "	9	33.9 "	10	35.9 "
Soft Drinks	16	20.0 cans	16	20.0 cans	16	18.7 cans
TOTAL ANNUAL EXPENDITURE PER HOUSEHOLD	$392		$509		$452	

* includes all tobacco sold
** Packaged factory made cigarettes only

TABLE 65

EXPENDITURES ON SELECTED ITEMS AS PERCENTAGE OF TOTAL INCOME AND EARNED INCOME 1965-66

	Cumberland Sd.		Broughton-Pad.		Clyde Area	
	Total Income	Earned Income	Total Income	Earned Income	Total Income	Earned Income
Item	%	%	%	%	%	%
Flour, sugar, fats, dry milk, tea, crackers, tobacco, gum, soft drinks	18.4	26.4	19.0	23.0	30.7	41.2
Rifles, motors, boats, skidoos	14.9	21.4	16.2	19.6	11.4	15.4
Ammunition, gasoline motor oil	23.0	33.1	16.2	19.6	12.0	16.2
Hunting equipment ammunition, fuel	37.9	54.4	32.3	39.1	23.5	31.5
All food items above, equipment, ammunition, fuel	56.3	80.8	51.4	62.1	54.2	72.8

TABLE 66

ESTIMATE OF RESOURCE HARVEST, 1965-66[1]

	Cumberland Sound		Broughton and Padloping		Clyde River Area	
Animal Species	Pounds Edible Food	Pounds Per Capita	Pounds Edible Food	Pounds Per Capita	Pounds Edible Food	Pounds Per Capita
Ringed seal	612,000	1,020.0	268,600	1,013.6	211,480	829.3
Harp seal	40,120	66.9	1,360	5.1	4,352	17.1
Bearded seal	9,516	15.9	3,660	13.8	31,110	122.0
Walrus	22,800	38.0	2,280	8.6	-	-
White whale	41,000	68.3	-	-	-	-
Narwhal	9,020	15.0	-	-	12,300	48.2
Polar bear	13,104	21.8	15,600	58.9	8,112	31.8
Caribou	58,800	98.0	4,900	18.5	24,598	96.5
TOTAL	806,360	1,343.6	296,400	1,118.5	291,952	1,144.9

Regional Total: 1,394,712 pounds edible animal products.

1. Modified from annual game reports. Edible products calculated from Table 11.

TABLE 67

ESTIMATED ANNUAL INCOME OF REGIONAL CAMPS 1965 - 1966[1]

Camp	Native Product	Wages	Welfare	Social Asst.	Per Capita Income	Per House Income
Twapine	69.2	7.6	13.1	10.0	422	2,534
Bon Accord	56.2	9.6	15.1	19.1	344	2,015
Imigen	41.2	13.9	18.1	26.7	301	1,392
Ikaloolik	45.9	11.0	22.2	20.9	278	1,763
Keemee	42.0	12.8	16.3	28.9	316	1,516
Iglootalik	38.4	12.6	18.8	30.2	242	1,534
Krepesha	51.4	11.5	25.2	11.8	240	1,682
Kingmikshu	55.3	12.1	18.3	14.2	288	1,598
All Cumberland Sound Camps	52.4	11.1	17.7	18.8	308	1,737
Naksalokolok	44.4	3.9	42.5	9.2	119	652
Akolearkatak	25.7	3.4	42.3	28.5	108	605
Pingwasook	21.0	59.8*	19.2	0.0	261	1,633
Supegayuktu	65.0	6.0	33.5	1.3	107	430
Ailaktalik	26.8	3.3	25.9	44.0	158	789
Pinera	59.7	4.5	35.8	0.0	142	1,139
Tekikait	68.4	2.8	28.0	0.8	169	929
Noolooeet	58.1	3.3	21.4	17.2	209	1,045
All Clyde River Camps	41.9	17.6	28.8	11.7	160	876

1. Cumberland Sound period 1st August 1965 to 31st July 1966.
   Clyde River period 1st June 1965 to 31st May 1966.

* Includes R.C.M.P. Special Constable, Cape Christian.

TABLE 68

ESTIMATED ANNUAL INCOME OF ALL SETTLEMENTS
AUGUST 1965 TO JULY 1966

Settlement	Percent of Annual Income: Native Products	Wages	Welfare	Soc. Asst.	Per Capita Income	Per House Income
	%	%	%	%	$	$
Pangnirtung	17.9	54.7	13.5	13.9	495	2,473
Cumberland Sound Camps	52.4	11.1	17.7	18.8	307	1,737
Broughton Island	19.8	65.1	8.6	6.5	540	2,894
Padloping Island	42.4	28.8	23.7	5.1	372	1,892
Clyde River*	12.7	71.4	10.4	5.5	458	2,607
Clyde River Camps*	41.9	17.6	28.8	11.7	160	876

* Period 1 June 1965 to 31 May 1966.